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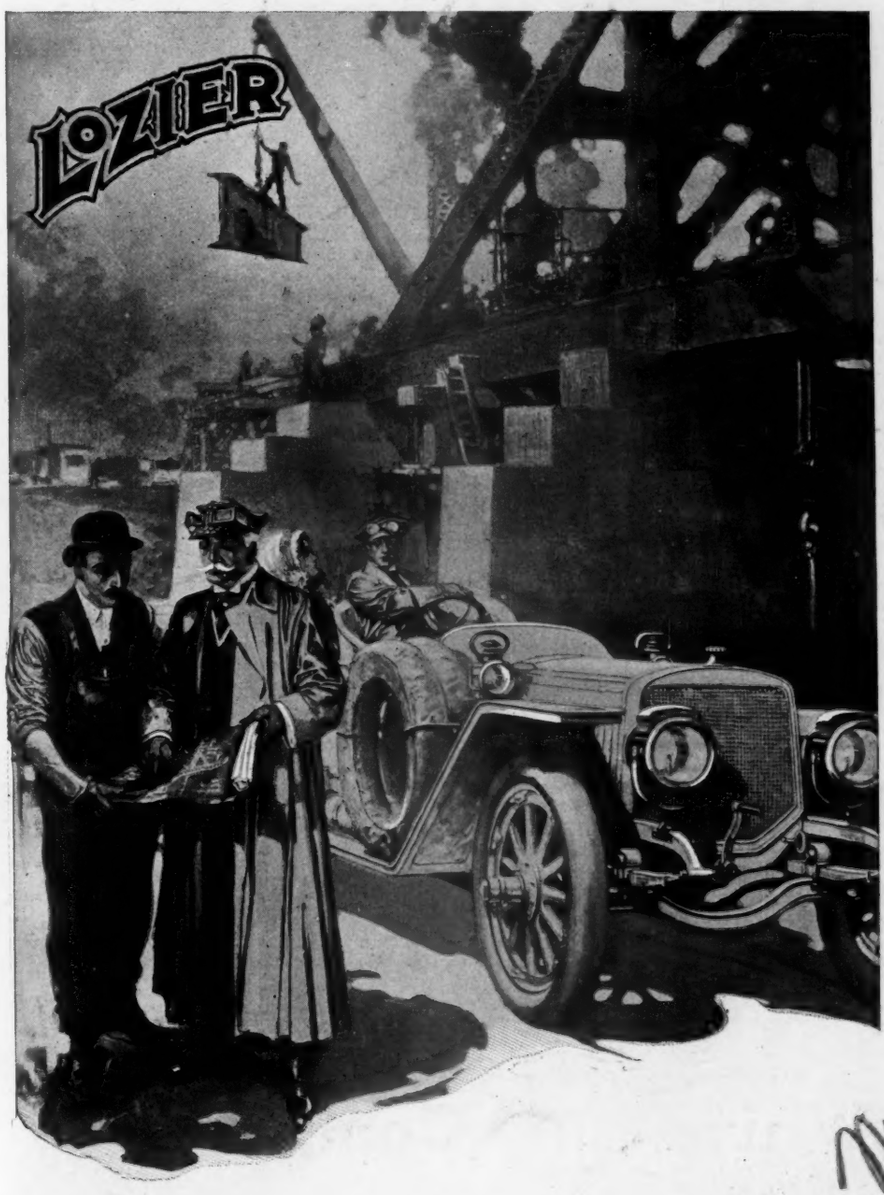
MOTOR AGE

VOLUME XXI CHICAGO, FEBRUARY 22, 1912 NUMBER 8



To the man of affairs, whose time is measured in big money value, a motor car of the character, dignity and power of the Lozier is indispensable; it has become an essential part of his business life and the social life of his family.

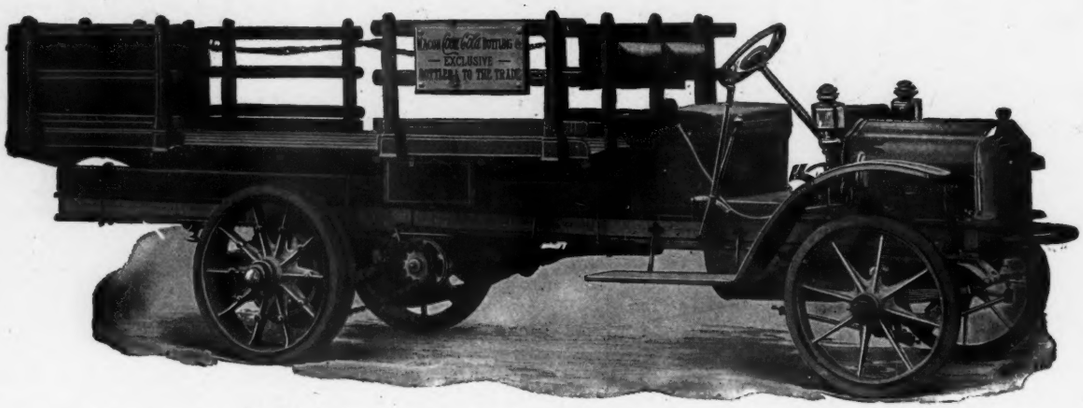
Lozier is the one touring car which for eight consecutive years has commanded a price of $5,000, or more

The name Lozier on a motor car stands for Lozier luxury, Lozier prestige, Lozier perfection in mechanical construction.

Lozier is the choice of "Men Who Know."

Six cylinder
51 H. P.
$5,000

LOZIER MOTOR COMPANY BOX 719 DETROIT



The Lesson of the Year

ANOTHER year has completed its cycle—the richest in experience with motor trucks that the world has ever known. And now, already the epoch-making "shows" are again claiming the attention of the whole automobile world, trying to visualize the progress which the twelve months have made. This experience and progress must have their lessons for every business which has deliveries to make. Perhaps the most important lesson is the fact that so many hundreds of businesses have found—not that they could use the motor truck—that was always true—but that it means so much to their business in increased service, in increased business, in general effectiveness all along the line. In showing business men this pleasant solution of their delivery problems, no truck has been more prominent or taken a bigger share of the burden than the White.

The Simplest Truck—The White

GREAT as has been the progress of motor trucking during the last year, numerous as have been the new fields tapped by this new method of transportation, motor trucking possibilities are just beginning to be understood, and with each succeeding day the field grows wider and wider until there seems to be no reasonable limit to the houses that can profitably use motor trucks. In this ever widening field, one truck must always hold its own, always be one of the first to be considered. That one is the White, because of the peculiar simplicity of its engine design—of ease of operating its engine and the making of any adjustments which may ever be necessary. Any engine built to-day would pattern after the White, because the designer would want to get all the power possible with the smallest charge of gasoline—in other words, power in its most economical—which means the long-stroke engine. The long-stroke engine, with its cylinders cast en bloc, is the simplest form of high-power motor, allowing an almost complete elimination of the usual paraphernalia that litter the average engine. The White engine is easy to care for and operate, is attractive to the driver, consequently does not discourage him to neglect his work; and this is half the battle. A truck engine with complicated mechanism that takes hours to unravel does not invite a tired driver to investigate the cause of some minor trouble which may very quickly become a major trouble if neglected. Further, the White Trucks are built in such capacities as to take care of all your business, being made in fifteen-hundred delivery wagons, ton-and-a-half, three- and five-ton trucks, with standardized type of engine in all.

Why not submit your delivery problem to us? Let us suggest the size and type of trucks you need. If interested we have testimonials of many in your line of business, which tell you better than we can what you can do with the White truck.

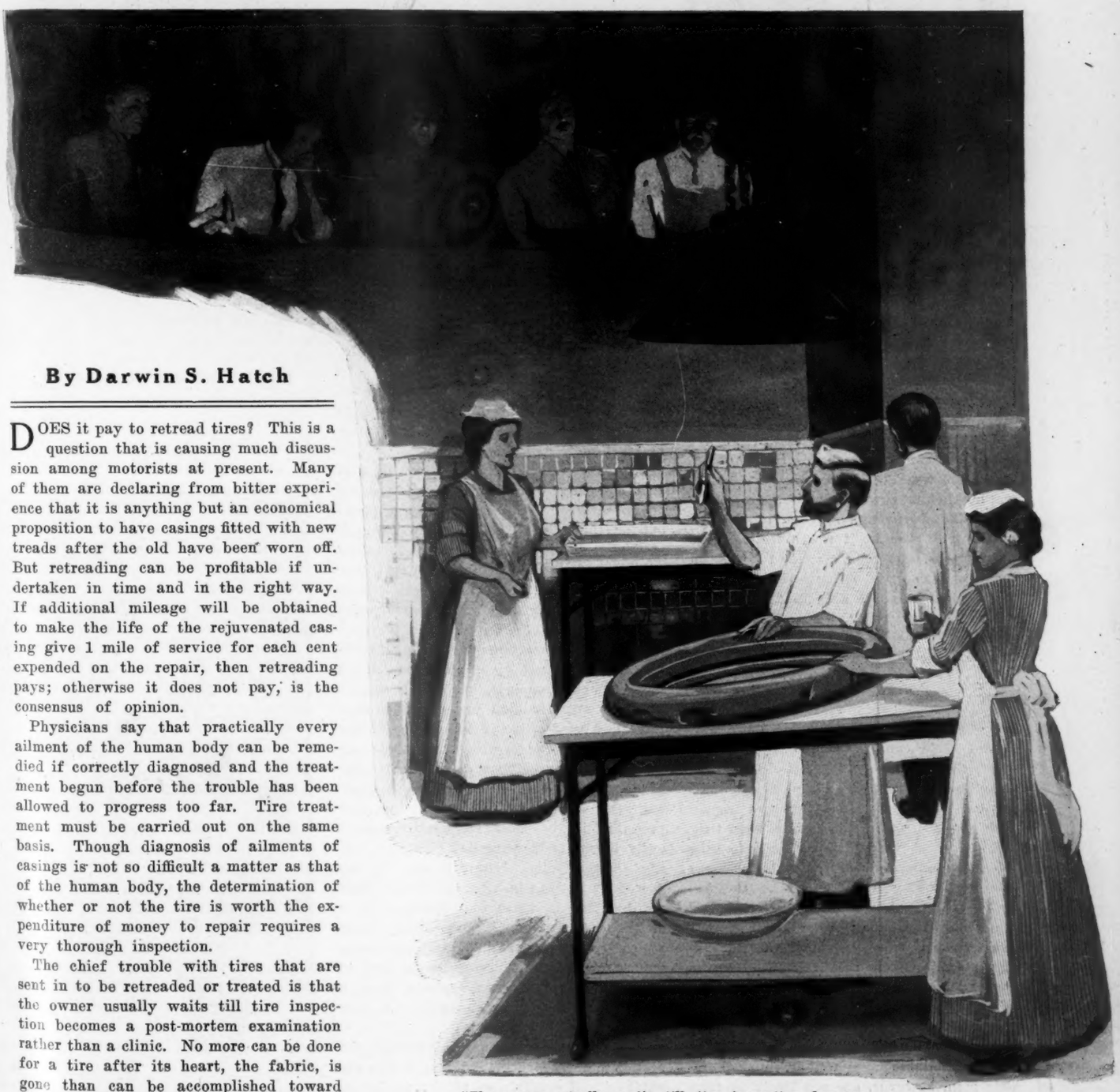
The White Company

810 East 79th Street, Cleveland, Ohio

VOL. XXI. No. 8 CHICAGO, FEBRUARY 22, 1912 $3.00 PER YEAR

MOTOR AGE

Diagnosing the Ills of the Motor Tire



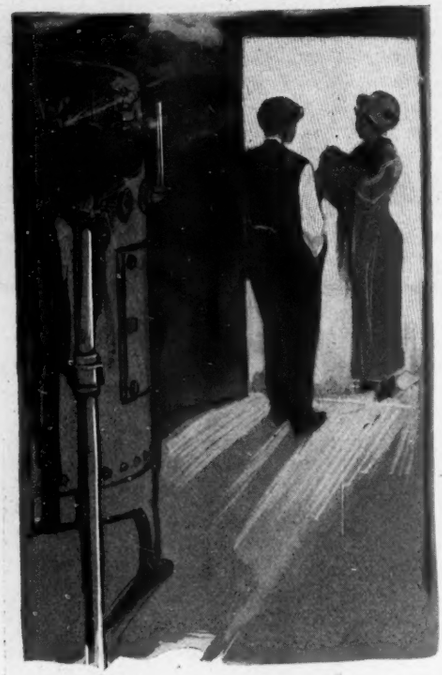
"The owner usually waits till tire inspection becomes a post-mortem examination rather than a clinic."

By Darwin S. Hatch

DOES it pay to retread tires? This is a question that is causing much discussion among motorists at present. Many of them are declaring from bitter experience that it is anything but an economical proposition to have casings fitted with new treads after the old have been worn off. But retreading can be profitable if undertaken in time and in the right way. If additional mileage will be obtained to make the life of the rejuvenated casing give 1 mile of service for each cent expended on the repair, then retreading pays; otherwise it does not pay, is the consensus of opinion.

Physicians say that practically every ailment of the human body can be remedied if correctly diagnosed and the treatment begun before the trouble has been allowed to progress too far. Tire treatment must be carried out on the same basis. Though diagnosis of ailments of casings is not so difficult a matter as that of the human body, the determination of whether or not the tire is worth the expenditure of money to repair requires a very thorough inspection.

The chief trouble with tires that are sent in to be retreaded or treated is that the owner usually waits till tire inspection becomes a post-mortem examination rather than a clinic. No more can be done for a tire after its heart, the fabric, is gone than can be accomplished toward saving a man whose heart has stopped



"The raw gum can be compared with bread dough—it requires just as careful watching

beating. And there is no pulmotor to resuscitate defunct tires. If a pump had been used to give them more air while their organs were in operation there would be a greater number of them still on the roads.

Tire makers are unanimous in saying that the question of the economy of retreading tires depends upon two things and on these two things alone. If the fabric of the tire is uninjured and has not been weakened by underinflation or water, then a new tread on the old carcass will add enough mileage to the life of the tire to make it worth while. This presupposes that the new tread is put on by a repairman who knows his business. Only such a man is able to tell whether the carcass is worth the expense of a new wearing surface, and only such a man is able to do the work with any assurance that a perfectly good tire body is not ruined by the actual process of retreading.

Carelessness Often Blamed.

The basic cause of the complaints of small tire mileage after retreading is due to either the incompetence or carelessness of the repair man. Many tire repair men accept tires for retreading when they know that they are too far gone to give adequate mileage afterwards to pay for the cost. They prefer to take the $10 or $15 for the job and run the chance of a dissatisfied customer to telling him that the tire is hopelessly beyond the retreading point. Often the ignorance of the owner leads the repair man from the path of professional rectitude and he yields to the insistence of the owner, taking the commission against his own better judgment. Reliable and well-established repair men, however, are not likely to take a retreading job unless they are confident that the owner will get an adequate additional mileage. Many of them go so far as to guarantee a definite mileage for the retreaded tire, which makes a pretty safe basis if the guarantor is reliable, a consideration which must be taken into account in any line of business.

Tire makers maintain retreading plants at most of their branches as well as at the factories, and must in the very nature of things maintain a better equipment and better trained men for the purpose than can be found in the smaller repair shops. They absolutely refuse to accept tires for retreading which in their judgment will not stand up long enough to pay for the operation. By such discrimination, the tire makers often are suspected of turning down good tires in order to sell new ones, but as a general proposition the per cent of profit is the same on retreading as on the sale, so there would be little advantage in pursuing such a course. The basis upon which the most of the manufacturers and the better class of repair men decide the practicability of retreading casings is on the cost-per-mile basis, the only one upon which this could be fairly figured.

Basis of Adjustment.

A very fair basis is on the cost of 1 cent per mile; that is, the casing is considered worth retreading if with its new lease of life it will give 100 miles for each dollar expended for the repair. In fact, one tire manufacturer guarantees the tires it retreads on this basis, and makes adjustments on this guarantee the same as if it were selling a new tire. If the charge for retreading a casing is $12, this company warrants it to give 1,200 miles' service. If there has been a blowout or the fabric has been cut through so that it is necessary to put in a section of carcass before retreading, the cost may mount up to $15 or 18, in which case the casing is guaranteed for a corresponding mileage.

There often are tires in which retreading alone will not give sufficient mileage to justify the expense, but which can be repaired at an added expense and then retreaded profitably. Such a case is the one just instanced in which the fabric had been cut. Retreading a casing with a cut or damaged fabric will result in a blowout after a few hundred miles' use, and probably is the most frequent cause of early blowouts in retreaded tires. A casing thus affected, however, can be repaired by putting in a new section of fabric, building it up in just the same way as the casing originally was made, after which it can be retreaded in the ordinary way. When it is necessary to put in more than two or three sections, usually it is considered cheaper to buy a new casing.

Another consideration which affects the economy of the retreaded tire is the capability and carefulness of the workman. A good tire can be ruined very easily at any stage of the retreading process; and the use of improper or inferior materials is almost certain to result in failure. To show the necessity for good workmanship it is necessary only to enumerate the steps required to retread a tire.

Retreading the Tire.

First, the casing must be thoroughly examined for flaws in the carcass and for places where the fabric has given way.

Second, if the carcass is intact, the old tread is cut away entirely around the casing with a knife.

Third, the outer fabric is cleared of the remnants of the tread on an emery wheel, the last two operations requiring great care that the fabric be not cut.

Fourth, the carcass is cleansed with gasoline and again examined for breaks.

Fifth, a layer of cement is applied and allowed to dry.

Sixth, a layer of special tread rubber is applied and pressed in with a small roller.

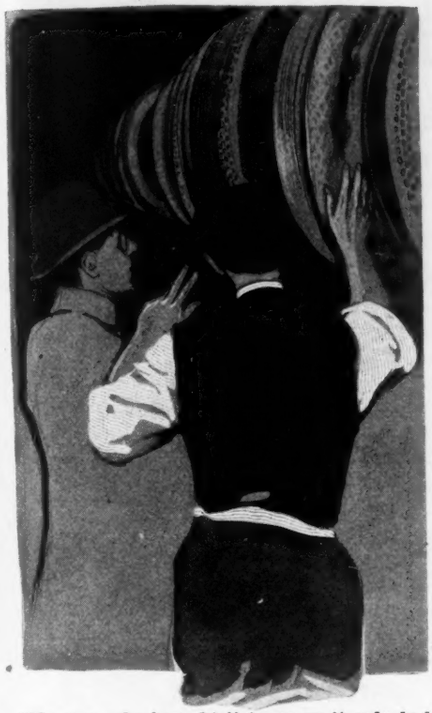
Seventh, successive layers of tread gum are cemented upon the casing until the tread is built up to its original thickness.

Eighth, a core is placed inside the casing to make it keep its shape and the whole wrapped with cloth, care being taken that an even tension is produced all around.

The last and most ticklish operation is the vulcanizing or curing of the raw gum of the tread.

In shops properly equipped for curing treads, the wrapped casing is placed in a large iron kettle and heated for some time, usually with steam. The raw gum can be compared with bread dough and

"The company receives the workmen from the small repairshop and puts them to work at tire-building."



"The man who brought it in swore it only had 1,000 miles of service."

requires just as careful watching that it be not underdone or cooked too much. Even more care is required because a part of the tire has been cured when the tire was first made and there is danger of overcuring it before the tread is heated sufficiently. Only an experienced hand can tell when the casing has been damaged by overcuring and many a retreaded tire goes out from the hands of an inexperienced workman which has been ruined by too much heat, only to give out altogether after a short run.

Every housewife knows how the finished product of the oven is affected by different grades of flour and other ingredients. In the same way different brands of tire materials require different treatment, and here is one of the frequent causes of trouble from casings retreaded by many repairmen. The cement, the fabric and the gum produced by one tire maker are each chosen to work best with the other products of that maker, and do not work so well when the cement of one maker is employed to bind the gum of another to the fabric of a third, and the whole treated according to the directions of a fourth. Such a method was pursued by a small repairman in retreading a tire that came to the writer's notice recently. The owner was thoroughly disgusted with the retreading proposition when the casing gave out after running 200 miles, as he felt that it was good for that much at least in its original condition.

Training Repairmen

Training tire repairmen is a difficult proposition where the makers cannot come into direct contact with them, but one maker has adopted a policy of factory training that is resulting in scores of better repairmen each year and at the same time assuring a steady market for this maker's line of supplies. During the winter months when the work of the outside repairmen is slack, this company receives the workmen from the small repairshops and puts them to work on tire-building at the factory, paying them the same wages as they received at home. Here the workmen learn the construction of the tire and the correct methods of caring for them. As this instruction is all based on the use of this firm's products, the repairman is very sure to use them in the field.

Granted, then, that with the carcass of the tire in good condition it is economy to have casings retreaded, there is little question that it pays to keep them in good condition. At the same time the necessity for retreading can be postponed indefinitely, with proportionate increase in the life of the tire. Go and talk to a tire man about troubles and ninety-nine times out of a hundred his first words will be, "Keep them pumped up!" According to all the customs of tire writing, that sentence should be emblazoned in glaring capitals at the top of the first page, for tire inflation is the keynote of tire service. This subject has been enlarged upon so frequently that it is only necessary to reiterate tire makers' injunctions to keep the inflation pressure up to that recommended by them.

Lesson in Soft Tires

Just a hint here; do not try to make the tire men believe that you have not been running with soft tires if the contrary is the case, for they can read the history of the tire from its appearance more easily than a physiogomist can tell your own life's history from your face. "See here," says the tire man, laying his hand on one casing among the dozens on hangers along one wall of the branch's service department. "See this casing? Well, the man that brought this in swore that it had only 1,000 miles of service and that it was always pumped up to 85 pounds. Now, although we did not tell him so, we knew he was lying. Why, you can see for yourself. That tread has worn so that the outer edges are rounded; the outside has been on the road as much, nearly, as the middle of the tread. If the tire had been pumped up enough, that worn band would have been less than 2 inches wide, and the outer edges of these knobs would have been sharp. He couldn't have worn the casing away that much in 1,000 miles anyway, not even on stone roads. See this scoring all the way around where the rim strikes? Rim cut—tires too flat. This ditch on one side here means that he has been running in the car tracks. Notice this little cut here on the tread? Now, then, I'll open it up so that you can see the inside. The fabric is broken clear through, but you can't see much damage on the outside. That was nothing but a stone bruise that chipped a very small chunk out of the tread, but at the same time broke or weakened some of the fibers in the fabric. The owner paid no attention to it—kept on running, probably half-flat, till the constant flexion of the unprotected fabric caused the neighboring strands of the fabric to break, till finally it ripped clear across here with a bang, and the owner cussed us for selling him a bum tire. The wonder is that it did not blow out before.

See how the tread has separated from the fabric? Water! All he needed to do was to clean out the cut with gasoline, fill it up with this dough for a temporary repair, and put in a sleeve or boot till he could bring the casing to us. We would have vulcanized the tread and, while doing so, would have found the weak spot in the carcass and fixed that. Then it would have been as good as ever. As it is, he has lost a tire and we have possibly lost a customer."

Temporary Repair

There are many of these plastic compounds on the market for filling up small holes and cuts in the tread, and the most of them are good. They keep out the water and dirt which, if allowed to enter, work in between tread and fabric, cause them to separate and eventually rot the cotton fabric. Such a repair lasts indefinitely, but it is usually considered better to have the cut vulcanized as a permanent repair. Small vulcanizers convenient for the owner's garage or to be carried on the road are supplied in many forms. These are arranged for curing small patches in tubes and casings, but care is needed that the tires be not hurt by overcuring.

There is no need to discard the casings

"All he needed to do was to clean out the cut with gasoline."

just because they have passed the retreading stage. They often are good for hundreds of miles more, although their length of life is problematical. After the first or second blowout they become too expensive on tubes. It is when the retreading point is past that the inner liners become the most useful.

Use of Tire Liners.

Discussion is rife as to the availability of the so-called tire liners as a means of lengthening the useful life of casings. Many tire makers say, and they are the ones that should know, that the inner liners are an economy if correctly designed and correctly installed. The great trouble seems to be that when they are not put in in exactly the right way, they tend to creep and the friction thus produced creates sufficient heat to destroy the tube. Other makers hold that inasmuch as the casing has been designed to have a certain thickness of material in its body and all of it an integral part of the tire, the introduction of additional material, and that with no mechanical connection to the rest, upsets the balance of the construction. Experience seems to show that inner liners have a field in increasing the mileage to be obtained from partially wornout casings.

NEW WARREN GENERAL MANAGER

Detroit, Mich., Feb. 19—Lucius E. Wilson, secretary of the Detroit Board of Commerce, has offered his resignation, to take effect April 1, when he will succeed J. G. Bayerline as general manager of the Warren Motor Car Co. Though only 33 years old, Mr. Wilson has been school teacher, salesman, secretary to the postmaster, secretary of the Greater Des Moines committee, an influential civic organization of Des Moines, Ia., and latterly, secretary of the Detroit Board of Commerce. Mr. Bayerline's future plans have not been announced.

JOINS DETROIT'S MOTOR COLONY

Detroit, Mich., Feb. 19—Detroit's importance as the hub of the motor car industry of the country has once more received recognition in the decision of the United States McAdamite Metal Co. of Brooklyn, N. Y., to establish a branch factory here. The company manufactures castings of McAdamite metal for motor car, light marine engines and aeroplane parts, the metal having an aluminuh base. The Brooklyn concern has purchased 350 feet frontage at the corner of Isabella avenue and E street. The new plant will be in operation by April 1.

HUMPAGE SUCCEEDS CHALFANT

Buffalo, N. Y., Feb. 17—Changes in the personnel of the management of the E. R. Thomas Motor Car Co. made necessary by the resignation of E. P. Chalfant as president are announced. F. R. Humpage steps from the vice-presidency to the presidency and is succeeded in the former office by W. L. Gleason. J. J. Ramsey continues as secretary and treasurer.

Flanders Makes His Peace

Unofficial Statement from Detroit Declares E-M-F President Will Remain With Studebaker—J. W. O'Brian Who Promoted Union Sales Co., Missing —Mitchell Holds an Election

DETROIT, Mich., Feb. 20—While no official announcement has been given out by the Studebaker corporation, it is stated on good authority that there has been a love feast which has resulted in the patching up of peace between W. E. Flanders and Paul Smith on one side and the Studebakers on the other which means that Mr. Flanders will continue as president of the E-M-F interests and Mr. Smith remain as sales manager. The talked-of deal whereby both Flanders and Smith were to withdraw from the Studebaker Corporation and confine themselves to the Flanders Mfg. Co., possibly bringing out a six-cylinder car, has vanished and now it is said nothing but harmony remains. Those on the inside say that the Studebakers gained a powerful leverage on the Flanders Mfg. Co. when J. N. Gunn and Scott Brown, representing Studebaker, secured positions as directors of the Flanders Mfg. Co., which enabled them, it is said, to have a strong voice in the doings of that organization. At any rate it is stated both Flanders and Smith will continue with the Studebakers.

UNION 25 PROMOTER MISSING

Columbus, O., Feb. 17—Considerable mystery surrounds the actions of a man giving the name of J. W. O'Brian, connected with and in fact the promoter of the Union Sales Co. of Columbus, who did extensive advertising in all of the motor papers and many of the daily papers of the country. About 3 weeks ago his office at 61 East Spring street, located on the second floor of the Central Ohio Automobile and Garage Co., was deserted and Mr. O'Brian was said to have left for parts unknown. It was understood from one of the employes of the garage that he went to Omaha and received some mail at that place under an assumed name, it is said.

At the Dunlap Engineering Co., South Parsons avenue, Columbus, O., where he was having the Union 25 assembled it was stated that the whereabouts of Mr. O'Brian was unknown. He is supposed to have come from the south and the Primo deal at Atlanta, Ga., is said to have been one of his promotions which failed after a few months of apparent success.

O'Brian's plan was, insofar as it can be ascertained, to secure deposits from local agents and if they were sufficient to attempt to complete the car, which was to sell for $650. It is claimed that he secured deposits totaling something between $1,500 and $2,000 which is supposed to have been taken with him, as he did not settle any bills of any kind while in Columbus. It is said he owes for office rent, and when the Dunlap Engineering Co. asked for compensation for work done in assembling the first car he was unwilling to pay and all of the materials at the plant were attached to settle the bill.

Manager Dunlap of the Dunlap Engineering Co., who attached the unfinished car and materials, is negotiating with a number of residents of an Ohio city to reorganize the concern and complete the car and put it on the market.

MITCHELL COMPANY ELECTION

Racine, Wis., Feb. 19—At the annual meeting of stockholders of the Mitchell-Lewis Motor Co., the officers and directors were re-elected as follows: Chairman of the board, William T. Lewis; president and general manager, William Mitchell Lewis; first vice-president, G. B. Wilson; second vice-president, J. W. Bate; secretary, G. Vernon Rogers; treasurer, Frank L. Mitchell; assistant secretary, G. E. Redman; assistant treasurer, William H. Armstrong, counsel, M. J. Gillen; European manager, Henry Plow. The report of officers showed a most satisfactory volume of business for 1911 and orders on the books on January 1 of this year were the largest in the concern's history.

RACINE MFG. CO. REORGANIZES

Racine, Wis., Feb. 20—There has been a reorganization of the Racine Mfg. Co. New officers have been elected and the capital stock increased from $400,000 to $800,000. The new president is F. K. Bull, a millionaire threshing machine manufacturer, who will become actively identified with the body-making concern, while the vice-president is J. W. Gilson, for the last 6 years sales manager of the Mitchell-Lewis Motor Co. G. W. Jagers is treasurer and Harold Smith secretary.

ANOTHER KELLY PROMOTION

Youngstown, O., Feb. 19—Another promotion comes to John H. Kelly, formerly manager of the Chicago branch of the Republic Rubber Co., who recently was elevated to the position of manager of the motor car tire department of the Republic company. Mr. Kelly's most recent promotion has been to the position of acting general sales manager of the company with complete control over the business not only in this country but in Canada and Europe as well.

Carlson Case in Courts

Defense in Suit To Prove Validity of Motor Patent Puts Forward Two New Lines of Argument—Railroads Answer Makers' Complaint—Sheldon Axle Co. Putting Out New Proposition

NEW York, Feb. 19.—In much more detail than at the previous hearings, the litigation between the Carlson Motor and Truck Co. and the Maxwell-Briscoe Motor Co. was presented to the United States circuit court of appeals Friday of last week and Monday of this. The case is one of great importance to the industry and has been handled in exhaustive fashion by both sides.

The suit involves the validity of claim 1 of patent 797,555 granted to Carlson on an improvement of a cover-plate for a motor having opposed cylinders, which contains the valve-actuating mechanisms. The case was taken to this court on behalf of the defendants after a ruling adverse to them in the lower court.

The defense put forward two new lines of argument in much detail, namely, the Walrath and Maxim defenses and touched upon two lines that formed the chief elements of the defense in the lower court. The new defenses embrace devices covered by patent 832,859 and 645,177. The first of these covers a stationary engine principle and the second the type of cover plate used by the Pope Mfg. Co. and in single-cylinder de Dion motors the close reasoning and arguments in favor of showing by analogy that these patents antedated the purpose of the Carlson device were carefully heard by the court. It is expected that an opinion will be handed down in about 3 weeks.

PROTESTS ELKHART SALE

South Bend, Ind., Feb. 19—Suit demanding $25,000 judgment and to set aside sale of real estate and personal property by the Elkhart Motor Car Co. to the Elmer Automobile Co., on the ground that the transfer was fraudulent, has been filed in the superior court at Goshen, by Glen B. Sawyer, trustee in bankruptcy of the Elkhart Motor Car Co. It is alleged that the transfer of property was made within 4 months prior to the filing of the petition in bankruptcy with the intent of defrauding the numerous creditors of the Elkhart Motor Car Co., mentioned in the deal.

ESTABLISHED AT JEFFERSON, WIS.

Jefferson, Wis., Feb. 17—The Waverly Motor Co. has elected the following directors and officers: President, C. W. Mack, Chicago; vice-president, F. P. Henning, Cambridge, Wis.; secretary and treasurer, Albert F. Haberman, Jefferson. The plant recently established here is now in operation and working to capacity. The product will be motors and motor cycles.

RAILROADS ANSWER COMPLAINT

Washington, D. C., Feb. 19—Twenty-one railroad companies have so far answered the complaint filed by the National Association of Automobile Manufacturers against seventy railroad companies, charging excessive freight rates on shipments of motor cars. Each answer is couched in practically the same language and is a general denial that the classification and rates of motor cars are unjust, unreasonable or unjustly discriminatory, or in violation of the interstate commerce law, and praying for the dismissal of the complaint. The railroad companies have until February 19 to file their answers. The interstate commerce commission has docketed the case and will take it up at some future time. No one connected with the commission is able to state just when the case will be called for hearing.

SHELDON'S NEW IDEA

Wilkes-Barre, Pa., Feb. 19—An entirely new proposition in the manufacture of trucks is that inaugurated by the Sheldon Axle Co., which concern since the first of February has been offering to truck builders a partially completed and assembled 1-ton truck chassis. This is composed of truck parts manufactured by the Sheldon company and consists of frame, springs, axles, jackshaft, brakes, brake rods, control set with levers, steering gear and foot pedals, structural steel frame work over the motor compartment which frame supports the gasoline tank and dash and to which the control set is attached. When the purchaser receives this assembled equipment, it is only necessary for him to supply the wheels, put in the motor, radiator, clutch and universal joint, gasoline tank, muffler, etc., and to mount a body on the frame.

PREST-O-LITE WILL NOT MOVE

Indianapolis, Ind., Feb. 19—An ordinance satisfactory to the Prest-O-Lite Co., making it possible for the company to locate its gas manufacturing plant inside the city limits, has been passed by the city council and the company states it will not move to another city. It had contemplated moving away, because for several years its gas manufacturing plant has been 5 miles south of the city, an ordinance forbidding the maintenance of such plants inside the city.

The new ordinance stipulates that a plant of the character conducted by the Prest-O-Lite Co. shall not be closer than 100 feet to any public highway or other building nor closer than 1½ miles to the center of the city. The plant must be enclosed and warning signs posted at each side of the inclosure.

The ordinance also prescribes the manner in which the gas must be manufactured, charged and stored and in the latter respect also affects garages. Where there are from twenty to twenty-five of the tanks to be stored they must be placed in a fireproof, self-closing box, and where there are more than twenty-five such tanks they must be kept in fireproof vaults as a precautionary measure.

A site for its new plant is now being sought by the company and a building 100 by 250 feet will be erected.

PUSHING GUAYULE PRODUCTION

Torreon, Mexico, Feb. 17—It is announced that the Intercontinental Rubber Co., of New York, and its subsidiary concerns, which are operating extensively in the manufacture of crude rubber from the guayule shrub in the states of Coahuila, Zacatecas and San Louis Potosi, has adopted plans for the erection of additional factories and a big increase of its output. W. C. Potter, of New York, the new president of the Intercontinental Rubber Co., who recently visited the properties at Torreon and other places in northern Mexico, was greatly impressed with the wonderful possibilities of the industry. On this trip of inspection Mr. Potter was accompanied by E. B. Aldrich, son of Senator Aldrich.

One of the most valuable holdings of the Rockefeller-Aldrich interests is the Cedros ranch, which embraces approximately 2,000,000 acres of land and is situated in the state of Zacatecas. This property was purchased several years ago by the Compania Ganadora y Textil, South America, which is a subsidiary of the Intercontinental Rubber Co. Mr. Aldrich is president of the subsidiary concern. It is stated that one of the plans which the Rockefeller-Aldrich syndicate has adopted to further develop their holdings is the construction of a railroad through the Cedros ranch.

MICHELIN PRICES SLASHED

New York, Feb. 21—Special telegram—Prices of Michelin tires and tubes have been sharply slashed an average of about 10 per cent. On the smaller sizes the cut amounts to less than that, but in the big sizes it ranges to almost 15 per cent. As an example, the regular 32 by 3½ size was $25.85 and now is $24.50. The 37 by 5 size was $66.10 and has been cut to $58.57. Tubes were reduced in about the same proportion.

PREST-O-LITE INVADES CANADA

Merriton, Ont., Feb. 20—The Prest-O-Lite Co. of Indianapolis, Ind., will open here in April a branch costing $5,000.

Corbin to Quit Manufacturing Cars

Connecticut Corporation, However, Will Continue 4 or 5 Years in Order to Maintain Guarantees —Miner Garage Co. Buys Entire 1912 Output—Eastern City Bidding for Edwards Plant—Electric Concern in Washington Bankrupt

NEW BRITAIN, Conn., Feb. 17—The Corbin Motor Vehicle Corporation, of this city, has decided to discontinue the manufacture of Corbin motor cars, which manufacture has been carried on in this city since the summer of 1903. The manufacture of the different Corbin models, including the 30 and 40-horsepower cars, will be discontinued as soon as the stock on hand can be absorbed. After that date the Corbin Motor Vehicle Corporation will not be dissolved, but will continue for probably 4 or 5 years and limit its activities to that of the maintenance department for the benefit of the present owners of Corbin cars. It is not the purpose of the company to dispose of its manufacturing machinery, etc., all of which will be absorbed by the American Hardware Co.

Simultaneous with this announcement comes that of the Corbin Motor Vehicle Corporation having disposed of its entire 1912 output of cars to the Miner Garage Co., of Hartford, Conn., which concern will sell during the coming season the different Corbin models, fully equipped, according to catalog specifications. This deal with the Miner garage has been made under a guarantee that the Corbin Motor Vehicle Corporation will furnish at reasonable prices all needed parts to purchasers of these cars and that they will continue a repair shop and garage, as stated above, for the benefit of Corbin owners.

The Corbin Motor Vehicle Corporation is a subsidiary company of the American Hardware Corporation, composed of the P. & S. Corbin Co. and the Corbin Lock Co., and the manufacture of motor cars has been carried on in departments of the American Hardware Corporation, these departments, however, being entirely separate from the hardware department, and the business of the motor vehicle department conducted separately.

OTHERS AFTER EDWARDS PLANT

New York, Feb. 20—The new Edwards Motor Car Co., which is being organized by C. G. Stoddard and H. J. Edwards, has taken temporary offices at 437 Fifth avenue in this city where the different details of organization of a company are being looked after. The final contract with Knight & Kilbourne for the purchase of a license to use the Knight double-sleeve valve type of motor was sealed and delivered last week so that the company is now open to go ahead in the matter of organization. Citizens in Indianapolis are making a special bid for the company. At a meeting called by some of the citizens in that city, more than $200,000 was offered and in a few days later, this amount was reported as raised to nearly half a million. But Indiana is not alone in bidding for this new company. From an eastern city has come almost equally as good offers, and it is said to be an unquestioned fact that the $1,000,000 capital will be readily subscribed as soon as a definite location for manufacturing is decided upon.

ELECTRIC CAR CO. IN TROUBLE

Washington, D. C., Feb. 20—The creditors of the Washington Motor Vehicle Co., with claims aggregating $1,139, today filed a petition in the district supreme court asking that the concern be adjudged bankrupt, the allegation being made that the officers of the vehicle company admitted the company's insolvency on January 15 last. A rule returnable March 6 was issued by Chief Justice Clabaugh. The creditors and their respective claims are: The Philadelphia Storage Battery Co., $1,066.15; Willard A. Simonds, $26.85; William & Co., $46. The company makes the Capital electric car, in which a large number of Washington business men hold stock.

H. M. SWETLAND IN THE TRADE

New York, Feb-19—H. M. Swetland, formerly president of the Class Journal Co., has been elected chairman of the board of directors of Wyckoff, Church & Partridge, Inc., manufacturers of the Commer truck and Guy Vaughan car, with factory at Kingston, N. Y.

BALTIMORE SHOW OPENS

Baltimore, Md., Feb. 20—Special telegram—From the way the 1912 Baltimore motor car show started in this evening in the huge Fifth Regiment armory, the indications are that it will be the greatest exhibition of the kind yet held in the Monumental City. There are more makes and varieties of cars to be seen in the booths than Baltimoreans ever have enjoyed and judging by the opening attendance, it would seem that the motor car fever has a firmer grip than ever on the local enthusiasts.

This week is for pleasure cars and accessories displays only, while three nights of next week have been set aside for the commercial feature of the show. There are thirty-six pleasure car dealers who are occupying booths and they represent fifty-one makes of cars. There is an average of five cars and chassis of the various makes of cars on the floor, which make a total of 225 cars included in the 1912 exhibition. The accessories and supplies exhibits are far in excess of any previous year, there being thirty-one firms represented. The show this year is being held under the auspices of the Automobile Club of Maryland and the Baltimore Automobile Dealers' Association.

ZUST OFFERS TO COMPROMISE

New York, Feb. 21—Special telegram—The Zust Motor Co., representing in a selling capacity the Zust factory, failed some time ago and has been in the hands of the courts for several months. The liabilities, according to the schedules filed this week, amount to $37,000. Harry Sidney Stewart, the attorney acting for the company, has presented a proposition of composition on a basis of 15 per cent of the proven claims. If this is accepted, and Mr. Stewart states that a majority of the creditors are agreeable, the arrangements will be concluded March 4. The Zust company probably will be reorganized in the near future.

ACETYLENE CASE UP

Trenton, N. J., Feb. 20—A preliminary injunction has been granted to the Commercial Acetylene Co. and the Prest-O-Lite Co. against Camille Bournonville, a supply man of Newark, N. J., prohibiting him from infringing the patent under which the Prest-O-Lite company is operating.

It was shown to the court that the defendant filled gas tanks for his customers in contravention to the patent rights held by the complainants. The patent in question was granted to Claude & Hess and is numbered 664,383. The inventors assigned the patent to the Commercial Acetylene Co. and it in turn licensed the Prest-O-Lite Co. There have been numerous litigations based upon this patent and one case went as far as the United States circuit court of appeals of the sixth district, resulting in a victory for the patentees. In the present case a relatively small amount of money is involved.

ONE MORE FOR NEW YORK

New York, Feb. 20—First among the gasoline pumping and propelling fire engines to be installed in the New York fire department is a monster six-cylinder Watrous motor car, which has been stationed at 39's house, which is located at headquarters. The new apparatus displaces five horses and their equipment. The car is rated at 126 horsepower and uses the propelling motor for pumping water. In its official tests the car made over 40 miles an hour and threw 744 gallons of water per minute. The apparatus was built by the Watrous Engine Co., of St. Paul, Minn.

New York Assembly Would Date Tires

Bills Introduced Both in House and Senate, Copied After Minnesota Measure—United States Tire Co. Retires from Retail Field—Gotham Supply Houses May Organize—Other Trade Happenings in East

NEW YORK, Feb. 20—The tire-dating bill has bobbed up again, this time in the New York legislature. So far, measures of this character have had a rather rocky road to travel, finding stumbling blocks in committee and afterward, but an active effort is being made to get the New York bill reported out of committee with some degree of promptness.

The bill was introduced in the lower house by Representative Lewis S. Chanler and was sent to the committee on general laws. On February 14 an identical bill was introduced in the senate by Senator Roosevelt. This was given to the committee on judiciary. The bill reads as follows:

Section 1—Chapter 25 of the laws of 1909, entitled "An act relating to general business, constituting chapter 20 of the consolidated laws," is hereby amended by inserting therein a new section to be section 394-a to read as follows:

"X 394-a. Motor Vehicle Tires to Be Dated. No person or corporation shall manufacture, sell, offer or expose for sale in this state a tire for use on a motor vehicle, unless the date when such tire was manufactured shall be impressed or branded upon the material whereof such tire is constructed, or otherwise indicated by label securely attached thereto. Every person or corporation violating this section shall be liable to a penalty of $50 for every tire manufactured, sold, offered or exposed for sale in violation thereof, recoverable in a civil action by any person who will sue for the same, one-half whereof shall be paid to the state treasurer. Such penalties shall be cumulative and more than one penalty may be recovered in the same action by the same person in any court of competent jurisdiction.

"X 2. This act shall take effect January 1, 1913."

The tire makers point out that while it is undoubtedly true that if casings are exposed to light, oil and moisture, they will deteriorate with the passage of time; that it is also true that if the tires are carefully packed and protected, a few months on the shelf at one of the depots will not tend to take any material amount of life from the tire.

They also state that the consumer nowadays buys miles when he purchases tires and that they stand behind their product, no matter if it is necessary to store it for a few months.

The history of tire-dating laws commences with the enactment of a branding law in Minnesota some time ago. This law at present is inoperative because the attorney general of Minnesota has decided that it would be impossible to enforce its provisions.

There is now pending in Georgia a bill to make branding of all rubber goods compulsory.

The tire companies are not so sharply opposed to this measure as they have been to some others, because of the broader option allowed in marking the tires. Under this law a securely affixed tag or label would be sufficient.

The matter is now under discussion in trade circles in New York, but no proposed plan of action is announced.

U. S. TIRES OUT OF RETAIL FIELD

New York, Feb. 20—Notice has been mailed by the United States Tire Co. to 18,000 dealers in tires and supplies that from the date of the notice the company will abandon the retail selling field in toto. Ever since the formation of the company it has done a large business through its branch houses at retail, dealing directly with consumers.

Placards have been hung up in all the branch houses of the company announcing that no retail business would be accepted. In the letter accompanying the notice to dealers, the company states that the reason for the change is to show its appreciation for the support given the company by the dealers generally. The new order is effective February 21.

The direct factory branches of the United States Tire Co. are divided into three great territories; divisions of the east, west and center. The eastern division includes the following branches: Atlanta, Boston, Buffalo, Hartford, New York, Philadelphia, Pittsburgh. The central division includes these: Chicago, Cincinnati, Cleveland, Dallas, Detroit, Houston, Indianapolis, Kansas City, Louisville, Minneapolis, San Antonio and St. Louis. The western division embraces these: Denver, Fresno, Los Angeles, Portland, Salt Lake City, San Francisco and Seattle.

The following notice has been sent out by the United States Tire Co.: "Joseph C. Weston, western district manager of the United States Tire Co. at San Francisco, is to take charge of the central district territory of the company with headquarters at Chicago. G. A. Gilbert, who has been assistant to O. S. Tweedy, eastern district manager, New York, has been promoted to the western district as manager and has left for San Francisco to take up his new work."

W. I. Philp, whom Mr. Weston succeeds, has not announced his future plans.

SUPPLY MEN MAY ORGANIZE

New York, Feb. 20—Conditions in the supply trade of New York have been considerably mixed for some time and a meeting was called last Saturday to consider ways and means of correcting some of them. The meeting was held at one of the Broadway stores and was attended by quite a representative gathering of the local sundry dealers.

The chief element of complaint was that, while trade is of gratifying proportions, a considerable factor that ought to produce profit was not so producing. Various theories were advanced to account for this condition. One of the chief speakers said that the local trade had been subjected to unfair selling conditions in being obliged to compete for an important part of the trade against an organization that has been receiving price concessions from manufacturers and jobbers.

Several plans of organization were considered and discussed at some length and the matter of forming such an organization will be taken up seriously later.

One of the companies represented had its attorney at the meeting to pass upon the likelihood of coming in contact with the Sherman law in case a hard and fast association was formed.

OWNER TAKES DYER LICENSE

New York, Feb. 19—Individual licenses under the Dyer patents have been granted to several owners during the past week in and around New York. The most significant move in this direction was noted with regard to Isotta cars. Dr. C. F. Pratt of Brooklyn, owner of a car of this make, was granted a license after the American representatives of the factory decided not to make a legal test based upon an individual case.

STUDEBAKER TO ISSUE BONDS

New York, Feb. 20.—In order to fund the floating indebtedness of the Studebaker Corporation without increasing its bonded debt, an issue of $8,000,000 of 5 per cent gold notes will be marketed through the bond house of Goldman, Sachs & Co. at some date between March 1 and 15. The bonds will be in serial form and one-twentieth of the issue will fall due each 6 months, beginning with September, 1912.

SHOCK ABSORBER DECISION

Trenton, N. J., Feb. 20—The United States circuit court of appeals for the third circuit has handed down an opinion sustaining the ruling of the court below in upholding the Truffault patent covering the rotary friction idea shock absorbers. The defendant in this action is the Weston Mfg. Co. of Jersey City, which was sued by the Hartford Suspension Co., licensees under the Truffault patent, for infringement. The patent at issue was granted on re-issue in January, 1906, and is numbered 12,437. The Hartford company has an action still pending against the Connecticut Shock Absorber Co., based on a different patent, number 803,589, granted in 1905. This suit was commenced last year and is still in the United States district court awaiting a hearing.

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Necessity for Salesmanship

A LEADING officer in one of the big motor car establishments of the country made the statement during the recent show circuit that he had traveled more than 15,000 miles during the past fall visiting all of the agents and many subagents of his company, and that the most deplorable situation he met with in his entire trip was the inadequacy of the salesmen in the different salesrooms in the different states of the union, which impressed him with the need of educating these men.

SCARCELY a dozen salesmen in the entire country had that pleasing and courteous address so necessary in disposing of cars; they did not know their job. In the first place they did not know as much about their own car as they should have; in the second place they generally were quite ignorant of the real merits of rival cars; and in the third place they displayed entire ignorance of the art and science of salesmanship. The company in question has not been asleep in the matter of agents' conventions, in the matter of bulletins on sales and many other recognized plans, but still when an unfamiliar face from the factory accidently dropped in without previous warning the real value of the salesman was discovered and his proper status obtained through this medium.

A COMMON fault with the salesman was his inability to look after customers. The salesman would be talking to one customer and another one would enter. Instead of momentarily excusing himself and setting customer No. 2 at ease with a catalog or in some other way, No. 2 was left alone, not a person looking after him for perhaps 10 or often 12 minutes. This is poor salesmanship. What person but has noted the ability of a salesman in a clothing, shoe or other store, to excuse himself for a fraction of a minute to get a seat or do some other little thing to hold another customer who has entered, thus keeping the latter in good humor while he is waiting.

THE motor car salesman should be taught the art of practical salesmanship the same as practiced in our big mercantile stores today. If he does not know the essentials then they should be brought to his attention before he is allowed on the floor of the selling room. The fact that a man knows the wheelbase and tire size of the car he is selling is not enough, he must know salesmanship and must know how to use it.

KNOWLEDGE of rival cars is a great essential with competent salesmen. Often a prospective buyer puts one over on the salesman purposely to test him and see if he actually knows as much about the rival selling cars as he claims to, and there is nothing which destroys the confidence of a buyer in a salesman more than to find him incompetent. It is not necessary to know all about the rival car, for a knocking argument—that is not salesmanship—but in order that the salesman can talk the strong points of his own car. A man always realizes more forcibly the good points in his own machine better when he is entirely familiar with the good points of his rival's cars. One car does not make an industry, and the salesman who knows but his own car is a poor man to make a sale in which the broad arguments or the motor industry become the real selling arguments. Know your own car and also know the car of your rival. It will make you a better salesman and will help to reduce your bump of knocking if you are so fortunate as to have one. No one ever really made a success by the knocking route. There is a difference between frank criticism and knocking and the salesman who can recognize this will be the one to profit most. A prospective purchaser generally knows this difference and he has confidence in the salesman who possesses the intelligence to avoid knocking.

Some Financial Conditions

MORE or less unrest has been created in several local circles within the last few weeks by the unusually large numbers of companies that have gone into receiverships and others that have been compelled to make large loans. The case is not one of alarm, rather the natural elimination of some of the weaker and smaller concerns that have been struggling for some months in financial straits. There have been one or two cases of late in which old established firms of limited product have figured, but their cases are very few.

FOR the last 5 or 6 years there has been a constant stream of money poured into the car development field by local investors in different territories. Not a few questionable promoters have talked in loud terms on big annual dividends from the car business; in one or two cases in the country these have been true, but the small-money man looking to invest a few thousands in motor car stock has been led to believe that nearly every concern has made big earnings. Not a few have lost much in this way, and the final elimination of concerns so organized must be looked upon as a healthy development of the car industry. The sooner every concern gets to bed rock the better for the industry, and the sooner several of the mushroom growths are weeded out the better.

IT is questionable if in any other industry there has been so many investors ready to pour cash into the reorganization of companies, many of which have been going through changes for several years. In every case it is the contemplated possibility of large dividends. The promoter or re-organizer has been quick to show how the old organization lost money by poor management, by not manufacturing the popular type of car, by poor manufacturing facilities, by having a poor engineering force, by having an incompetent selling force or a score of other excuses that have been trumped up. This widespread promotion business has been more than cut in two within the last year or so, and it has all been for the ultimate value of the industry.

NEW blood is welcomed into the industry, legitimate failures are deplored, but the high-dividend promotion man should be eliminated. The city-to-city promoter is not a credit to any industry, and the sooner we are free from him the better. It is not a difficult matter to differentiate between the new organization operating along sane lines and with a sane proposition and the promoter who sets out to talk and do the impossible in car production, in car engineering and in the matter of dividends. It is to be hoped that the growing motor truck industry will be kept more or less free from the undesirable promoter. The lessons of the pleasure car industry are of yesterday and today, and if the man with money does not know of them it will be up to him to pay for experience, as so many of his brothers have done within the last few years.

Belgium Announces New Kind of Race

Team Affair to Be Promoted This Year—Bruce-Brown and de Palma to Drive in French Grand Prix—Lozier Retires

BRUSSELS, Feb. 7.—The "coupe du Royal Automobile Club de Belgique" is the title of a new international motor car contest which has been promoted by the Royal Automobile Club of Belgium. Announcement was made public a few days ago by the club officials who believe the event will be a success because it is different from others thus far held and caters to the regular stock car, the kind the manufacturers are making and selling currently.

It will be a 2-day race—600 kilometers—373.2 miles—to be covered each day, by teams of three cars of the same manufacture, with a cylinder capacity of from 2 to 4.5 liters. Each car will have to maintain or travel at an average speed per hour according to the cylinder capacity of the motor.

The elimination of the contestants will be brought about as follows: On the first day all cars which have not averaged the specified speed for a distance of about 100 kilometers—62.2 miles—will be considered as out of the running, while on the second day the elimination will take place over a distance of 50 kilometers—31.1 miles—in the same way as on the first day.

In order to determine the winner from among the contestants not eliminated, points will be credited to each contestant for every lap or circuit completed at the specified average speed, and these points will be increased by one-tenth for each lap. Thus, for the first lap the contestant will have 1 point for his credit, for the second lap 1.1 points, etc. The number of points of each team will be added and the one having the greatest number will be declared the winner, providing there remain several teams in the race at the end. If only one team remains complete, it will of course be the winner. If there remains no complete team of three cars of any one make then the winner will be the one car credited with the greatest number of points.

Entries are to be made by the manufacturers but if they do not care to enter a full team, then private owners may add the number required, but only with the maker's consent. The entry fee will be $300 for a team up to April 1, and double that fee thereafter. A team does not have to consist of three cars of similar cylinder capacity, but no car will be allowed which has less or more than the specified capacity.

The race will be run over a circuit and upon macadam roads. There will be one specified place at which stops for tire or rim-changing and replenishing may take place. Repairs to the car must be made by the driver and mechanic with the tools and means aboard the car.

Thus far it is stated that nine Belgian cars have been entered, namely three Vivinius, three Springuel and three Imperia. As the race is not to take place till July or August—no date has yet been decided upon—other entries surely will be made.

AMERICAN IN FRENCH RACE

Chicago, Feb. 19—Even if no American car manufacturer outside of possibly the Ford participates in the French grand prix next summer, there will be at least two American drivers in the international classic—David Bruce-Brown, winner of the American grand prix, and Ralph de Palma. This information reached Chicago today in a letter received by Eddie Hearne from the Benz company, which states that Bruce-Brown will drive his Savannah Fiat in the French grand prix and that de Palma will have the same Mercedes he drove at Savannah, which, however, will have several improvements on it. Bruce-Brown, while he was in Germany, visited the Benz factory at Mannheim, where he was told the Benz company would do nothing for him in the way of expenses.

The severing of relations between Hemery and the Benz company also is officially announced, the German makers stating that Hemery is to drive a de Dietrich in the French grand prix. They also claim that their former designer has gone with De Dietrich and that he is engaged in the manufacture of an eight-cylinder car of 300 horsepower which will be turned over to Hemery for an attack on the world's straightaway records now held by Burman, who at present is in Cuba, where he will participate in meets at Havana this month and next, after which he intends going to Ormond for record trials, it is said.

LOZIER QUITS RACING

Detroit, Mich., Feb. 19—The Lozier Motor Co. has officially announced that it will not participate in any speed contests during the season of 1912 and that it will not register its cars with the American Automobile Association's contest board. This means that it will not defend the Vanderbilt cup or try to win a second leg on the Elgin National trophy. This makes Ralph Mulford a free-lance. Mulford, however, wants to run his own Lozier for the Vanderbilt and possibly the Lozier company will grant him permission to do so on his own hook.

President H. A. Lozier still is a believer in racing but thinks the Lozier company has accomplished what it set out to do—eliminated weaknesses. "Notwithstanding the claim that has been made that racing teaches no lesson to the manufacturer, I am more than ever convinced that the engineering department of any motor car manufacturing concern can in no other manner so unerringly determine the value of mechanical principles applied to stock cars and so quickly detect weaknesses and faults as by participation in long-distance racing events," says President Lozier. "I believe buyers of types of cars which have proven themselves consistent winners in the great racing events of the country are agreed that it is these cars which have made the best record for service and endurance in the hands of the public in touring and all-around work. We have made the claim that we never have marketed a mechanical mistake and we have been able to make this claim for the reason that every new model or every improvement which we have contemplated was tried out in early models entered in stock contests, and where weaknesses or mistakes were discovered changes were made before any number of cars had been sold to users."

CHICAGO TRUCK RUN PLANS

Chicago, Feb. 17—The Chicago Motor Club has decided to spread its commercial vehicle demonstration over 4 days instead of 3 as originally planned and to differ from last year by stopping one night in some town about 90 miles away from Chicago. The dates are May 15, 16, 17 and 18. In all probability the first day's run will be to Rockford, where the trucks will be garaged over night; the second day they will return to Chicago; the third day will be devoted to an out and home trip, probably to Fort Sheridan and back, while the fourth day the trucks will be asked to operate in the business zone. Grade 1 rules will prevail.

BAKERSFIELD LOCAL RACE

Los Angeles, Cal., Feb. 19.—The Bakersfield road race, which is set for February 29, will be strictly a local affair. All cars entered must be owned in Bakersfield and must also be driven by a driver who has been in Bakersfield at least 1 year. The course will be 212 miles and will be the most difficult road race of the kind ever held in the west. The cars will go two laps of 106 miles each. The roads are rough and sandy. This course leads through the famous oil districts of Kern county and the car that averages 50 miles an hour will make fast time. Instead of classes as last year, the run will be one free-for-all in which any kind of a car can be entered. At this writing the entry list is uncertain, but the promoters announced that they expect to have a National, Cadillac, Simplex, Pope-Hartford and half a dozen others.

Newark Show Important in a Retail Way

In Heart of Wealthy Community, Millionaires Wait For Annual Exhibition Before Placing Their Orders for Cars

NEWARK, N. J., Feb. 19.—Representative of the motor industry of the entire state, the fifth annual show of the New Jersey Automobile Exhibition Co. was opened in the First Regiment armory last Saturday night, under circumstances quite in accord with its importance. The product of no fewer than seventy-four car factories is being displayed by fifty-nine agencies or branch houses. Of these an even sixty are pleasure cars, the remaining fourteen being commercial vehicles. In addition there are twenty-eight exhibits of accessories of various kinds—the whole forming an exposition which, while it includes the products of factories located in almost every state in the United States, is peculiarly representative of New Jersey and Newark itself.

Newark's Trade Importance

Aside from the fact that within a 10-mile radius of this city are located some of the largest manufactories of accessories in this country, such as electric horns, shock absorbers, carbureters, windshields, radiators, bearings, wood wheels, electric lighting devices and a score of other similar products, Newark is beginning to assume importance as a commercial vehicle manufacturing center. Here already are located the Newark, Lansden, Commercial and Bronn-Sauter factories, not to mention an addition to the main Mack plant and the Saurer establishment at Plainfield, and arrangements are under way for the forming or transfer of similar concerns in the near future. The comparative cheapness of factory sites here and the propinquity to the metropolis is the combination that is forcing Newark to the fore in this respect.

In officially opening the show, Curtis R. Burnett, president of the Newark Board of Trade, called attention to the prominent place that New Jersey in general, and Newark in particular, has assumed in motor car manufacturing and allied trades. More than 20,000 men, he said, are employed in such industries in this state, in addition to which there are upwards of 500 garages with more than 3,500 employes and 7,000 chauffeurs. Mr. Burnett urged the state legislators to consider the vast and growing importance of this trade to New Jersey and to do all they can toward bringing about proper legislation, "so that residents of our state may treat the motorists of other states in the same manner as all of the other states in the union are treating each other. We must have reciprocity on an honorable basis if we wish to retain the volume of business we now have, and at the same time secure a larger share from the manufacturers who are now discriminating against Newark and New Jersey whenever they have an opportunity, owing to the fact that they are barred out of the state unless they comply with arbitrary and inconvenient rules."

While it is too soon to forecast the value of the present show as a trade-quickener, it is almost certain that in this respect it will far outclass previous local exhibitions. Newark is the entrepot to the northern half of the state of New Jersey; previous years have witnessed the placing of numerous agencies and sub-agencies through the local branch houses; all the local plants which turn out cars and accessories are represented—these conditions, along with the fact that from its beginning, 6 years ago, the Newark show has registered hundreds of retail sales, would seem to warrant the optimistic predictions of the exhibitors and the management.

Right at Newark's doors lies that opulent region known as the Oranges, dotted with the palatial homes of several thousands of New York's successful business men. These men of money usually wait for the annual Newark show before investing in a new car; they flock to the show by hundreds, bringing their wives and children with them. Last Saturday night the streets north, south, east and west of the armory on Sussex avenue were fairly choked with the cars of this class of patrons. They will visit the show several times during the week, and the last day or so will witness broken records in retail selling. It always has been so. Those who aver that local shows do not pay will have a hard job convincing the Newark show exhibitors that such is the case.

Big Cars Are Popular

While the medium-priced car—from $2,000 to $3,000—is the favorite in the Newark section, all the representatives of the most costly cars who were interviewed by the Motor Age man were enthusiastic over the prospects for the coming season. There is a noticeably small proportion of the less-than-$1,500 class to be found in and around Newark, while the electric is just beginning to get a toehold here. The hills of North Jersey—the most delightful touring ground in the country—call for reasonably high power, which possibly accounts in large measure for the comparative scarcity of the small motor car in this section.

The past year has witnessed a most remarkable spurt in the commercial car field in the Newark section. The excellent work done on long hauls by the vehicles of Gotham's big department stores has been a daily object lesson of which local merchants have not been slow to take advantage. The establishment of commercial car factories here within the past year or so has also had a beneficial effect. Local department stores, grocers, bakers and merchants are experimenting with motor delivery; some have already gathered together a sizable equipment. The virtues of motor apparatus have appealed to the Newark fire officials, and half a dozen pieces are already in service. The prospects in the commercial car line here may be said to be distinctly good.

OMAHA OPENS SEVENTH SHOW

Omaha, Neb., Feb. 19—The seventh annual Omaha show, which opened at the Auditorium this evening is the largest and most comprehensive motor car exhibition which has ever been staged in this section of the country. There are a total of fifty-two exhibitors who are showing 165 pleasure cars, a score of trucks and delivery wagons, and accessories of all kinds. Every available inch of space in the Auditorium has been utilized, and it is only because of the lack of room that more cars are not exhibited.

The crowd on the opening night was the largest that has ever been present the first evening, and indications were that the attendance would be nearly double that of preceding years. Before the show was opened, it was said that there were more dealers in the city than attended during the week last year.

The main floor of the Auditorium is taken up with the exhibits of pleasure cars. Thirty-three dealers of Omaha and Council Bluffs are displaying fifty-seven different makes of cars. On the stage, five companies are exhibiting supplies of all kinds. In the basement twelve dealers are displaying fourteen different makes of commercial cars.

Four Council Bluffs dealers are exhibiting at the Omaha show. They have been barred out the last few years, on account of lack of space but this year it was decided to allow them to exhibit. Council Bluffs, Ia., is only 4 miles from Omaha, and the territory of the dealers of the two cities is practically the same.

LIMA SHOW LOSES MONEY

Lima, O., Feb. 17—Though it is believed to have been a great success from a purely commercial point of view, so far as the finances for charity are concerned, the Lima Automobile Dealers' Association show at the Auditorium, which closed recently, did not end as anticipated. With a total attendance of about 1,600 paid admissions, and with an expense account exceeding $500, the total figures show a loss of about $100.

Two Exhibitions Are on in Minneapolis

One Affair Being Held in Armory and Other in Auditorium —Ottawa, Grand Rapids, Pittsburgh and Cincinnati Displays

MINNEAPOLIS, Minn., Feb. 19—Two shows hold the public eye this week and the expected attendance is nearly 200,000. The fifth annual show of the Minneapolis Automobile Association is in the National Guard amory with 60,000 square feet of floor space, and the first annual show of the Minneapolis Automobile Retail Dealers' Association is in the Auditorium with 15,000 square feet of exhibition space. The latter show is from February 19-22 and the other opened Saturday night and will run to February 24.

At the armory show are fifty-four entrants on the main floor with 220 motor cars; thirty truck and tractor exhibits in the basement and in the balcony are twenty-five accessory exhibits. The exhibit of farm tractors is the first and it is considered a remarkable one as it shows the growth of the popularity of the internal combustion engine as applied to farm use.

At the Auditorium are fifteen exhibitors of pleasure cars showing sixty exhibits. Two hundred exhibits are shown of accessories. At the two shows are to be a total of 1,500 individual outside dealers, if the attendance continues as the start.

Governor A. O. Eberhart and members of his staff attended the opening of the armory show and the governor pushed the button that started the machinery, after complimenting the dealers on their good standing and Minneapolis as the metropolis of the state and the natural distributing mart for motor cars. The governor said that he had driven a car for years on a wheelbarrow income. He called attention to the conversion of the farmer to the motor car, due in part to the large expenditures by motor clubs of their own money on roads, and now the farmers are helping to make the roads good.

At the opening there was a large attendance of factory representatives and several of the dealers from the northwest who in aggregate of some 1,500 are going to visit the two shows, making their contracts for the year and get new ideas. Several dinners are on the program before closing night for the motor car makers and agents.

Mayor J. G. Haynes, Secretary of State Julius Schmahl and Rev. J. E. Freeman, popular speaker, took part at the opening of the Auditorium show. An orchestra played and the organist offered a program. This show is marked especially by the motor cycle exhibit, as the armory show has a special feature of farm tractors. At the Auditorium, which is a smaller building in floor space than the armory, the opportunity for sightseers is excellent from the two rows of balconies and from the enormous stage. It is expected that next year the armory will be double its present size making the double show unnecessary.

The Twin Cities now have four shows a year and the expense is heavy to the dealers, factory branches and other manufacturers. One show is at the state fair grounds in the fall, one at St. Paul and two at Minneapolis.

The total attendance at the St. Paul show was 14,000 and the net receipts about $6,000. This is to be divided between the association and the St. Paul Automobile club. Dealers disposed of an average of five cars each at their exhibit booths.

SHOW IN DOMINION'S CAPITAL

Ottawa, Feb. 17—The first show to take place in Ottawa, the capital city of the dominion of Canada, was opened last Tuesday night by Mayor Hopewell. The crowd at Howick hall easily convinced the management that there was room for such a show, and it will become an annual event hereafter. There are thirty-seven motor car exhibits and twenty-one accessory and motor cycle exhibits. The value of exhibits is $750,000.

Last year about 250 cars were purchased by citizens of Ottawa and the surrounding valley. At present it is estimated that 500 cars are owned in the city. The average value of every car is about $1,500, or a total outlay of $750,000 for motor cars in less than 5 years. There are, of course, more expensive cars in the city, ranging from $5,000 to $15,000 each.

GRAND RAPIDS' THIRD SHOW

Grand Rapids, Mich., Feb. 17—The third annual Grand Rapids show, held in the Klingman Furniture exposition building, was a success in every way, and it is safe to predict at the present time that next year's show will require more space than the one this year. This year there was more than 50,000 square feet of floor space, the exhibition occupying the first floor, a sub-basement and the floor of a half story of the building.

At Grand Rapids' first show there was not a self-starter in evidence. At the 1912 show there were few booths indeed at which self-starters were not shown. More than 200 motor cars were seen at the 1912 show there were few booths indeed driven. Ten years ago the number of gasoline cars in Grand Rapids was infinitesimal. There wasn't a four-cylinder motor in western Michigan.

Every booth had its stripped chassis to exhibit, one of the features of the show being the arrangements of the booths with the idea of allowing the spectator to see every model. The biggest spaces were given over to the Ford agency, Starrton-Woodcock, Vandecar, Overland, Mitchell, Adams & Hart, and Moran.

PITTSBURGH ATTRACTS THOUSANDS

Pittsburgh, Pa., Feb. 17—The second annual exhibition of the Pittsburgh Automobile Association opened tonight. Former Pittsburgh shows—and they have been no mean affairs either—fade badly in comparison with tonight's exhibition witnessed by 12,000 people. In the great exposition hall at the Point are to be seen tonight also the largest display of motor cars and accessories ever shown in Pittsburgh. Every space is taken and additional room for a half dozen big exhibits was provided at a late hour in the areaway in front of the office.

Pleasure cars occupy the center of the mammoth first floor space. On either side of the broad aisles, are ranged the motor trucks. This exhibit is so far ahead of any previous exhibit of its kind in Pittsburgh as to emphasize more than ever the rapidly growing popularity of the heavy truck for delivery purposes on Pennsylvania hills and grades. Fully nine-tenths of the trucks shown are models in actual use in western Pennsylvania, most of them in the immediate Pittsburgh district and the agencies represented fully expect to make sales of an equal number of trucks next week, judging by the interest and inquiries today.

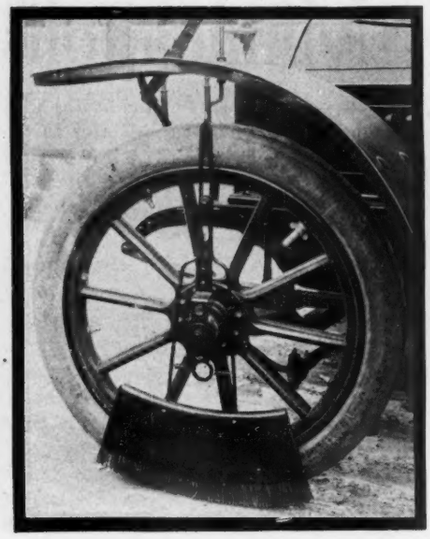
CINCINNATI SHOW ON

Cincinnati, O., Feb. 20—Cincinnati's fifth annual show under the auspices of the Cincinnati Retail Automobile Dealers' Association, now in progress at Music hall, opened last night, thousands of the city's social elite being in attendance as well as the socially prominent of southwestern Ohio, southwestern Indiana, Kentucky and West Virginia. Cincinnati's grand central states motor event of the year was opened with a speech by Simeon Johnson, president of the Cincinnati city council, who on behalf of Mayor Henry T. Hunt, congratulated the motor interests on the exceptional enterprise shown in securing such a remarkable show place as Music hall, which has greater capacity for the showing of motor and other industrial products than any other in this section of the state. The exhibitors number sixty-seven.

BROCKTON DID WELL

Brockton, Mass., Feb. 19.—The commercial truck show here last week, following the pleasure car exhibition of the week previous was more of a success than had been anticipated. Large crowds attended both shows and the local dealers report a good business.

French Put on Test to Discover Device

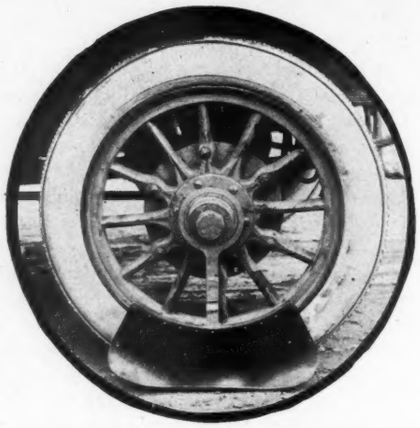


DREUX, WINNER FIRST PRIZE

COURSE USED IN MUD-SPLASHING TEST IN PARIS

PARIS, Feb. 5—How to prevent lateral projections of mud from the wheels of motor vehicles was the Sunday morning theme set by the Automobile Club of Seine-et-Oise at Versailles. In organizing its competition the club was encouraged by the municipality of Paris, by the General Omnibus Co. and some of the taxicab companies, all anxious to discover a cheap apparatus capable of effectively protecting foot passengers from mud-splashing.

Twenty makers presented themselves with what they respectively considered to be the best appliance for remedying the evil, and each apparatus was tested on the wheels of a car run over a specially prepared mud track. The course was laid over very rough paving stones in front of the historic Versailles chateau, and owing to its extreme roughness was more arduous than the usual conditions under which the guards will have to work. To control the efficiency of the appliances, large white boards were placed at intervals on each side of the mud track, and on the face of the boards were painted horizontal and vertical black lines, thus forming a series of white squares. The number of squares having received mud splashes were counted after the passage of each car; a minimum speed of 15½ miles



NERON-BRISTOL, THIRD PLACE

an hour was insisted on. After the splashing tests, all the appliances were examined by the jury with a view to simplicity, easy of fitting and dismounting, facilities for cleaning, general appearance, and finally were tested by being driven close alongside the edge of a roughly made sidewalk.

The splash guards could be broadly divided into two classes: leather, rubber, or canvas and rubber guards swinging from the hub caps on the outside of each wheel. Guards of this type have been in use for several years on the omnibuses of the Paris General Co., but have proved inefficient owing to their tendency to revolve with the wheel; if they can be made to hang vertically they are fairly efficient. The second class consisted of deep-faced rings of leather, rubber, or canvas, the same diameter as the tires, attached to either the rim or the spokes in a suitable manner, with a certain amount of space left between the wheel and the guard. In this class is the Menu guard, made of discarded pneumatic casings, and having met with a certain amount of commercial success in France.

In the opinion of the jury, the most efficient type was the Dreux splash guard belonging to the first mentioned class. The guard consists of a long thin brush bound with leather, thus leaving about 2 inches of the bristles exposed, and attached to the hub cap. The method of attachment, however, made it practically impossible for the guard to be carried round with the wheel, for instead of being mounted directly on the hub cap, the guard was carried on a vertical

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Human Efficiency in Business

THROUGH scientific management much has been acomplished along the material and mechanical side of production and distribution, but the human factor of efficiency has not reached in proportion the same high standard, and for this reason the business man and the manufacturer are now confronted with and are attempting to solve the human phase of this efficiency problem.

"Increasing Human Efficiency in Business," by Walter Dill Scott, professor of psychology of Northwestern university, is a most excellent book along this line. It is full of helpful suggestions, not only to the employer but to the employe and should be read by each.

Professor Scott's theory is that increased efficiency may be obtained through the principles of psychology; that as primitive business methods have been supplanted by the most modern and up-to-date systems, so the laws of psychology applied to business are bringing about and will bring about just as wonderful an improvement in human efficiency generally.

One of the many factors in this efficiency problem, which the author discusses and which he considers of utmost importance, is that of imitation. "We no longer think," says the author, "of imitation as a characteristic only of animals, children, and weak-minded folk. We have come to see that imitation is the greatest factor in the education of the young and a continuous process with all of us. The part of wisdom, then, is to utilize this power from which we cannot escape, by setting up a perfect copy for imitation." Therefore, it should be the aim of every concern to see that department heads are men of energy, enthusiasm and efficiency

To Stop Mud Splashing Pedestrians

INDICATOR BOARD AFTER PASSING OF A CAR

GRUYELLE, SECOND PLACE

member received on a stud projecting from the hub cap, and also passing through a hole bored in the mudguard. Naturally provision was made for the movement of the road wheel in relation to the mudguard. A slight fore and aft swing of the splash guard was provided for, but this was limited by a couple of coil springs.

The Gruyelle, which won second prize, differed in the method of attachment, the guard itself consisting of a brush carried on the outer end of a fork mounted on one side to the steering pivot, and on the opposite side to the hub cap. This apparatus was distinctive by reason of its careful workmanship and the ample provision for keeping out dirt, and for allowing of lubricating the moving parts.

In the Neron-Bristol, which came third in the list of awards, there was a simple all-leather splash guard hanging from an arm swinging from the hub cap. Its own weight kept it down, but friction was reduced by fitting a disk on the hub cap to engage in a groove of the ring forming an integral part with the arm. Ease of dismounting was assured by having this arm in two pieces, the lower portion rigidly

MORAND SPLASH GUARD

connected with the splash guard hooking onto the upper portion permanently attached to the road wheel. The following appliances differed only in their method of attachment to the hub caps, and it was not until the eighth prize that the disk type of guard came forward. This was the Garchey-Itasse, consisting of a light metal ring having its outer edge bound with rubber, and the whole attached to four points on the spokes by means of elastic bands. These, of course, allowed it to rise in order to overcome obstacles met with on the road. The Menu, placed immediately after this, was formed of the walls of a discarded pneumatic tire, mounted on a metal ring of the correct diameter, and attached to the spokes with suitable spring-metal arms. It had the advantage of detracting less from the appearance of the car than any of the others that were in the contest.

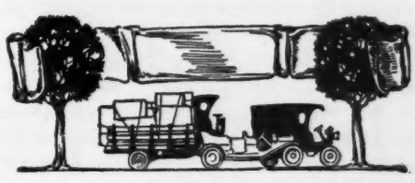
The most efficient appliance was the Morand, which, however, failed to secure any mention on the list of awards. It consisted of a sheet metal casing completely encircling the wheel, leaving only the spokes showing from the outside, and avoiding the use of ordinary mudguards. It was impossible for mud to be flung in any direction, but evidently the jury had doubts as to its longevity over ordinary roads, and was not convinced of its beauty. Selling price was a determining factor in the awards, and under this heading the Morand was at a disadvantage, for no account would be taken of the fact that ordinary mudguards were dispensed with. There was considerable variety in the cost of the appliances: some of the cheaper ones were offered for $12 a set, while others ran as high as $120.

—a perfect model for imitation. Imitation and emulation go hand in hand.

"We first imitate and then compete," and the author in a following chapter discusses the value of competition which is essential to the greatest success, and cites as an example the Carnegie system in which were matched "furnace against furnace, mill against mill, superintendent against superintendent" in the struggle for efficiency and supremacy.

Loyalty, a reciprocal relationship, is another worthy factor which is analyzed as one of the means towards this efficiency goal. On this phase of the subject he says, "Personality is, beyond doubt, the primitive wellspring of loyalty. Most men are capable of devotion to a worthy leader. * * * The employe is loyal to the foreman and not to the generality known as the House." Through this loyalty to the individuals constituting the firm loyalty to the house ultimately will develop, but to attempt to first create loyalty to the house, the author argues, is to go contrary to human nature and is "an unwise expenditure of energy" on the part of individuals.

Another aspect of this efficiency problem on which much emphasis is laid is that of concentration, with suggestions not only for the employer in making concentration easy for his employes, but for individual efficiency. It is through concen-



tration that "men of moderate capacities have secured results apparently beyond the reach of genius."

Many other phases are discussed and analyzed; helpful and valuable suggestions given, all tending to aid in attaining the many attributes that make for human efficiency. Macmillan Co., New York. Price $1.25.

Waubonsie Trail Piercing Illinois

Progress Being Made on Scheme to Lay Out Highway Extending from Washington, D. C., to San Francisco—Du Pont Pushing Good Roads Work in Delaware—New Beach Course Opened at Galveston, Texas

BLOOMINGTON, ILL., Feb. 19—Blazing the Waubonsie trail, a proposed national highway, to extend from Washington, D. C., to San Francisco, earnest promoters of the movement are now working their way east across central Illinois and hope soon to reach the nation's capital, the Atlantic terminal.

It is the ambition of the Waubonsie Trail Association to secure this great nation-wide course without expense except to those residing on either side, requesting only sufficient funds to pay for adequate signposts and a designating mark for the guidance of tourists. Already the trail has been laid from Denver to Bloomington and, county by county, the route is divided off until during the coming fall it is hoped to announce that the entire line has been developed.

Iowan Originates Idea

The project originated with U. J. Reininger, of Shenandoah, Ia. Already the trail extends for a distance of 2,000 miles and soon another thousand will be added when the organizers reach the eastern goal. Starting from Denver, the trail works east across the state of Iowa, crossing the Mississippi at Keokuk, and thence through Carthage, Bushnell, Canton, Peoria, Bloomington, Danville and Indianapolis.

The national association, which has headquarters in Shenandoah, is subdivided into state and county organizations. The latter has for its membership all persons interested in good roads, and primarily farmers residing along the trail who will agree to keep the road opposite their tract of land in good condition by means of periodical dragging, while all mud holes must be eliminated by proper drainage. By dividing the work and expense in this manner, there is no great amount of either and the result is a first class national highway, passable and in good condition 12 months of the year, all without calling upon the national or state treasuries for coöperation.

An interesting feature of the movement is the distinguishing sign which must be shown at all crossroads in order that the tourist will not go astray. Telephone or telegraph poles at all junction points where uncertainty about the route might exist are marked with three bands of white, each a foot in width. If no wire pole is standing, a special pole must be erected carrying the insignia of the Waubonsie trail. In addition to the white striping, signs must be shown, pointing the way and giving the number of miles to the next city. When the great national highway is organized, it will be possible for the tourist to drive from Washington, D. C., to San Francisco, Cal., without asking a single question concerning the route.

The promoters conservatively estimate that when the trail is in good working order that there will be from 15,000 to 25,000 cars annually make the transcontinental journey. With an average of four persons to a car, it will be seen that the number of persons en tour will range annually from 60,000 to 100,000. As these tourists will spend money liberally for food, lodging and various supplies en route, it will be to the pecuniary advantage of all cities, towns and villages to support the movement and consider the value of such a stream of travel passing their door. The value of land adjacent to the road is certain to be increased. Iowa farmers who were fortunate in being along the route estimate that their land has advanced $10 per acre in value while they anticipate a small income from the sale of produce and perhaps gasoline.

As soon as the main road is lined up from one end of the country to the other, it is proposed to take similar action with crossroads extending to important cities beyond. For instance, it is proposed to improve a trail from Bloomington south to St. Louis and north to Chicago. This will enable tourists from those metropolitan centers to strike the trail at a nearby point and then proceed east or west as desired. Similar action will be taken at points in Iowa, Indiana and Ohio, these feeders being gradually increased until there is a system of hard, well kept and carefully marked roads which will prove of incalculable value to the nation and states.

Origin of Trail's Name

The name of Waubonsie was adopted because of its oddity and in honor of a great Indian chief at the head of an Iowa tribe who was a friend of the whites. There are no fees, dues or salaries in this movement, simply a general coöperation to secure a national highway free to all.

DU PONT PUSHES ROAD WORK

Wilmington, Del., Feb. 17—Having begun actual construction of a boulevard to extend the entire length of the state of Delaware, T. Coleman duPont, it is understood, is contemplating assisting in a continuance of this road from the lower end of Delaware to Cape Charles, Va., which is the end of the peninsula, which, when completed, will make a boulevard from Philadelphia, Pa., to Cape Charles, a distance of nearly 250 miles. Mr. duPont also may assist with the work in Pennsylvania.

Having discovered that the special law passed at the last session of the Delaware legislature, under which he is working, may cause delays, as certain approvals, relative to route, etc., have to be given by the court, and having decided to have two branches to the road in the lower part of the state, one extending to Selbyille, on the east side, and the other to Delmar, on the west side, while the law permits of only one continuous road, Mr. duPont is considering the advisability of asking Governor Pennewill to convene the legislature in extra session next month, to consider amendments to the law that will overcome these difficulties.

It is intimated that after the present project is completed Mr. DuPont will continue his good road work in the state, and also in some other states, as he considers the benefit to the public from good roads to be inestimable and he is willing to utilize his fortune that way, as well as his spare time.

NEW BEACH AT GALVESTON

Galveston, Tex., Feb. 17—In the completion of the giant concrete causeway across Galveston bay, by which means this city and island is given a vehicle connection with the main land, there is accomplished the opening of a new era for the motorists of this part of southern Texas. It brings the main land territory, including the city of Houston, in close touch with the magnificent beach speedway, the excellence of which is declared by drivers to be the equal of that of Ormond beach. This course is 200 feet wide and 35 miles long. While this magnificent beach has been known to local motorists ever since the introduction of cars here, it has not been available to the people of the main land owing to the lack of any vehicle bridge across the bay. The causeway is 2 miles long and connects at each end with a magnificent system of highways.

Leading from the main land approach of the structure is a 50-mile road to Houston, and running east out of that city is another stretch of improved road 85 miles long to Beaumont. From Beaumont a new shell road runs southwest to High island, 43 miles, where the beach bordering the gulf is struck, and from there to Port Bolivar is a level and hard course 28 miles long.

AFTER NEW ORLEANS-DULUTH ROAD

New Orleans, La., Feb. 19—The very considerable influence of the New Orleans Automobile Dealers' Association was pledged yesterday to support the movement for a new national highway between New Orleans and Duluth. One of the essentials of good roads in Louisi-

ana and Mississippi is drainage and the dealers' association has arranged to meet with the National Drainage Association, which convenes here April 10-13. The importance of better drainage of the road between New Orleans and Baton Rouge, is to be urged. This will form the first section of the New Orleans to Duluth road. The present road follows the levee along the Mississippi river, for the greater part of the distance, where the seepage helps materially in keeping the road in bad condition. A change in the road bed is proposed which will necessitate extensive drainage.

ORGANIZE TO GET HIGHWAY

Richmond, Va., Feb. 17.—At a well-attended meeting held Thursday night in the auditorium of the Jefferson hotel, the Virginia division of the Quebec-to-Miami International Highway Association was perfected, the following officers being named: Joseph E. Willard, president; R. B. Alport, secretary; Oliver B. Sands, treasurer; R. L. Montague, first vice-president; H. W. Anderson, second vice-president; J. C. Easley, third vice-president; Sam Cohen, fourth vice-president; and Preston Belvin, president of the Virginia State Automobile Association, fifth vice-president. The nominating committee asked the privilege of naming five more vice-presidents at a later date. Fifty members were enrolled.

C. J. Meetze, member of the house of delegates from Prince William county, said the people of Manassas pledged $10,000 toward the Virginia link of the great highway.

MONEY FOR PENNSYLVANIA ROADS

Harrisburg, Pa., Feb. 17.—More than $500,000 is available for the work of the state highway department in the improvement of the roads of the state through the decision given by Attorney-General Bell in regard to the disposal of the money derived from motor car registrations and licenses, and the probabilities are that a good portion of the money will be used for maintenance.

The income from motor registration this year bids fair to exceed that of last year, as up to this date 21,516 cars have been registered. In addition, 8,405 chauffeurs have been licensed, 2,333 dealers were given license tags, and 212 licenses issued to minors. Last year the total registration was close to 45,000 cars, or 11,000 more than in the preceding year.

The wiping out of the last of the state's bonded indebtedness last week will be used as an argument in favor of the adoption of the proposition to borrow $50,000,000 in order to carry out the Sproul bill. Last week witnessed the entire reduction of the commonwealth's debt.

CHICAGO AND MILWAUKEE ORGANIZE

Milwaukee, Wis., Feb. 19—The Chicago-Milwaukee Good Roads Association was formally organized at a meeting of highway improvement boosters from Chicago and Milwaukee on February 15. The association will at once be incorporated under the laws of Wisconsin, a license to operate in Illinois then to be procured. On Tuesday, February 27, directors and officers will be elected, by-laws adopted and a membership campaign begun.

The articles of association are so broad in scope that membership will be induced from all classes—farmers, dairymen, citizens, manufacturers, merchants, motorists, and in fact everyone who will benefit directly or indirectly from the improvement and maintenance of a trunk highway between Milwaukee and Chicago. The annual dues will be $2.

It was decided that all moneys raised in the state of Illinois for the association will be devoted exclusively to work on that part of the proposed improved highway which lies within Illinois, and all Wisconsin funds will be applied to the work within the state of Wisconsin.

The Chicago Automobile Club is promoting the project in Illinois and the Milwaukee Automobile Club is working with the Citizens' Business League of Milwaukee from this end. The M. A. C. already is planning a mammoth barbecue, to be held on the improved road at the state line, upon the completion of the work.

CLUB FIGHT POSTPONED

New York, Feb. 20—The pitched battle scheduled to take place between the old guard and the insurgents of the Automobile Club of America on Monday night failed to materialize and truce was declared for a month. In the meantime, however, both sides will await with interest the rendition of a report by a committee on arbitration, to which the matter at issue was referred.

The trouble at the club arose over the fact that some of the members thought they saw an attempt to form a permanent oligarchy on the part of the present administration, the attempt being illustrated by the tenor of a series of constitutional changes proposed for enactment at the annual meeting. The chief point about these proposed changes was the legalization of voting by proxy.

Almost 600 members of the club gathered last night to do battle on the proposition, but before the skirmishers were engaged, President Sanderson, through John G. Milburn, counsel of the organization, presented a compromise suggestion in the shape of a resolution that the whole matter be referred to a special committee of two regulars, two insurgents and five neutrals. There was some sharp debating on the resolution, which was eventually adopted. The neutral faction on the committee is composed of Henry W. Taft, Clarence H. Mackay, Robert Bacon, Theodore N. Vail and August Belmont. The other factions will be named immediately.

Further consideration of the dispute has been postponed until March 19, but the committee must do its work before that time, for the instructions given the committee provide that notice of its findings shall be made to all the members by or before March 12.

As a result of the troubles at the club, Charles Fosdick, who has acted as secretary of the organization since he succeeded Samuel M. Butler in that position about 2 years ago, has resigned. Mr. Fosdick sided with the insurgents when the campaign first opened and President Sanderson recently ordered him to secure desk room outside of the club. About a week ago matters came to a crisis and at the meeting last Monday Mr. Fosdick's formal resignaion was presented and accepted.

TO FIGHT WHEEL TAX

Washington, D. C., Feb. 20—It was learned today that Leroy Mark intends to carry to the supreme court of the United States, a test case of the so-called wheel tax law. Mark has been assured the support and co-operation of a large number of owners in the effort to have the highest court in the land pass upon the law which recently was held to be constitutional by the district court of appeals.

The motorists, of whom there are more than 5,000 in the District of Columbia, feel the tax is an injustice, in view of the number and amounts of other taxes they have to pay. It is understood an appeal will be made to the motorists for financial aid in employing prominent attorneys to prosecute the case. The revenue from the wheel tax law, it is said, will amount to more than $50,000 a year.

INDIANAPOLIS AFTER TOUR START

New York, Feb. 17—The city of Indianapolis has made formal application to the American Automobile Association for the start of the national tour, Mayor Samuel L. Shank having written as follows to the A. A. A. executive committee: "The people of Indianapolis will be very much pleased if you can arrange to have the 1912 team contest tour start here. In view of the fact that we have the greatest speedway in the world and are second to none in the quality of cars manufactured, we think this an ideal starting point for this event."

Governor Emmet O'Neal of Alabama has asked that the tour pass through Montgomery in case New Orleans is the finishing point.

STEBBINS STEPS UP

Detroit, Mich., Feb. 19—H. G. Stebbins has been appointed eastern district manager for the General Motors Truck Co., with headquarters in New York City, and as such he will have full charge of all the company's eastern interests. Mr. Stebbins has been traffic manager for General Motors for several years and he retains this position in connection with his new duties.

Worm Drive—Its Merits and Designs

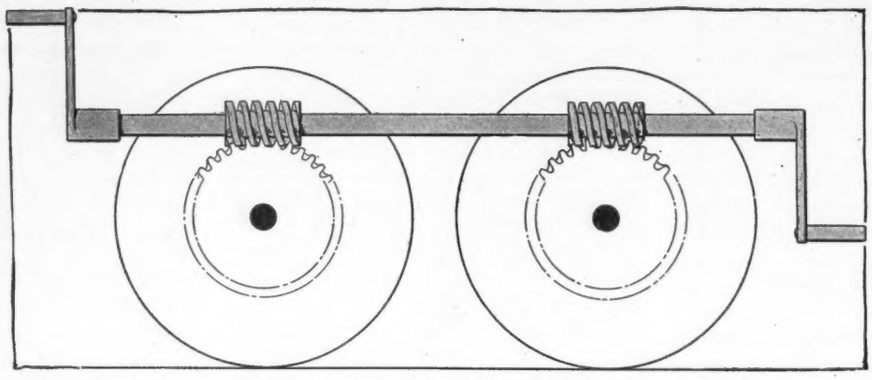


FIG. 1—ANCIENT ADAPTATION OF WORM DRIVE IN ROME

Absence of Noise Has Been Big Factor in the Popularity of Worm Drive—Strength of Worm Teeth, Great Range of Speed Reduction, Reduced Size of Axle Housing, and Continued Quietness After Much Wear Are Some of the Leading Merits as Compared with the Bevel Axle Drive

By J. S. CRITCHLEY

IT IS now some years since the first successful worm drive was applied to the rear axle of a motor car, and it is curious that though this first application was entirely successful, yet few manufacturers appear to have been possessed with any inclination to follow the lead thus given. It was Mr. Lanchester, it is believed, who first recognized the good qualities of a worm transmission from the propeller shaft to the rear axle, and this gentleman's first car thus fitted appeared on the road more than a decade ago. The Lanchester cars have invariably embodied the worm and worm wheel as parts of their transmission system, and yet it can be said that it has not been till the last 2, or, perhaps, 3 years that the worm-and-wheel has been seriously considered by the larger British manufacturers.

At the motor show at Olympia last year quite a number of firms exhibited worm-propelled chassis, and undoubtedly this fact constituted one of the features of the show. At the time of writing it seems likely that the worm will be a still stronger feature of the forthcoming Olympia show, though as a matter of fact one firm of considerable reputation has reverted to the bevel drive, the reason for this not being, however, at all obvious.

Before proceeding to a more serious discussion of this subject, it is perhaps of some little interest to note that the very earliest inventors of road vehicles seem to have been in favor of a worm for propulsion, for it can be noted on reference to an early print that during the reign of the Emperor Maximilian what consisted apparently of a species of triumphal car had a pair of worms and worm wheels, the former actuated by hand power, for purposes of propulsion. A diagrammatical sketch of the driving mechanism of this extraordinary vehicle appears in Fig. 1. The ancients appear to have realized very thoroughly the excellent properties of the worm and worm wheel as media for obtaining considerable mechanical advantage, for such contrivances appear constantly in ancient prints. This brief historical note must lead to matters of more modern and technical interest.

Many engineers have an objection to the worm-and-worm-wheel method of transmitting motion on the ground that sliding contact is introduced in place of the rolling contact of the bevel wheel; but it is as well to remember here that in the piston of the motor car engine as well as in the crankshaft journals and bearings there exists sliding contact—though of a nature not quite similar. Imaginary trouble becomes real in cases where the engaging teeth of the worm and wheel are imperfectly formed, so that what may be at the best only line contact becomes something rather like point contact; the enormous surface pressures in cases of this sort very quickly annihilate lubrication, and destruction of material is bound to follow. It must be stated here that whereas in the case of the ordinary straight worm, Fig. 2, line contact is obtained, in the case of worms of the best design having concave faces such as are fitted to the Lanchester cars surface contact exists.

The success or non-success of the worm drive resolves itself very much into a question of efficient lubrication. If a thin film of lubricant can be maintained between the surfaces in contact—or, one should perhaps say, between the surfaces otherwise in contact—there is no reason why serious wear should occur any more than in the case of a heavily loaded, but efficiently lubricated, journal bearing. It is probable that trouble in connection with wear mostly occurs when the engaging surfaces are not correct in form, as just mentioned, or when, either owing to bearing wear or to some give or elasticity in some part, the pitch lines of the two pieces no longer intersect.

In connection with the factor of efficient lubrication it is of great importance that the surface of the worm and its wheel should not only be perfectly adapted to each other, but that they — the surfaces — should be glass smooth. That lubricant is more readily retained between surfaces that are perfectly smooth than between surfaces that are—speaking comparatively—rough, is perfectly well known, though more than one theory has been advanced to account for this fact. Perhaps the interstices lying between the projections of the rough surfaces form as it were canals or channels on an infinitely diminutive scale, along which the lubricant is permitted to flow in an endeavor to escape from between the surfaces under pressure. It would seem that the more perfectly smooth the surfaces in contact, the closer may they lie to each other and, therefore, the less opportunity is there for the escape of the interposed lubricant. However, this is a question bearing perhaps more correctly upon the subject of lubrication than upon the subject under present discussion.

The question of efficient lubrication is closely associated with that of the type of lubricant to be employed. It can be taken now, as proven, that castor oil is of all lubricants the most efficient and most satisfactory to use. Its superiority over such lubricants as thick gear oil has recently been shown by actual tests. Castor oil gave the very high efficiency of 97 per cent, as against an efficiency 2 per cent lower or thereabouts for other oils. The working temperature of the lubricant employed affects the efficiency of the drive greatly, and it is generally considered that from 160 to 176 Fahrenheit is about the best. At temperatures much below these, say, about 68° or 88°, efficiency drops 3 or 4 per cent, owing to the too glutinous nature of the lubricant at these temperatures. At a higher temperature than 176° or thereabouts, most oils lose their efficiency somewhat as well, though castor oil is not so much affected as some. Castor oil indeed does not appear to heat up as rapidly as most oils when used in a worm axle casing, and after about 2 hours' work only attains a temperature 104° or 127° in excess of the surrounding atmosphere.

There are other considerations which

influence the position of the worm; chief of them is undoubtedly road clearance. This factor is such an important one that it has been the cause of the super-posing of the worm by a few of British manufacturers—to mention a couple, Dennis and Argyll, though other firms, such as Lanchester, Daimler and Sunbeam, use the under-type of worm. As applied to cars for use in countries where the roads are not of the best, an underneath position of the worm is certainly objectionable.

There is one other factor which, perhaps, has some effect upon worm position, namely, its relation to other parts such as gearbox and engine. Presuming that the propeller-shaft axis and that of the gear shafts are to be kept in line, a superposed worm practically involves an engine and gearbox sloping up towards the rear of the car; whilst placing the worm benearth involves a slope in the down direction. In either case the height of the engine from the ground—the engine clearance—is not affected. This consideration carries but little weight therefore.

Now, turning to the question of the advantages of the worm over the bevel system of transmission, these might, I think, be set down as follows:

1—The complete absence of noise in the running of worm and worm-wheel.

2—The fact that should either or both of these parts become worn, silent running is but little affected thereby.

3—Great strength of the teeth owing to their form.

4—The great range of reduction that is possible with any given centers.

5—Generally, a reduction in the dimension of the axle casing and, therefore, some diminution of unsprung weight.

6—The alternative positions for the worm and its shaft, thus allowing—sometimes advantageously—a little latitude in design.

It will be realized that these advantages are all peculiar to the worm drive as opposed to the bevel drive, and in order that an impartial opinion as to the relative merits of the two systems may be formed, it will, perhaps, be not unfair to set down what appear to be the disadvantage of a worm drive as opposed to the bevel system.

1—The fricitional losses incurred, unless the worm and its wheel are perfectly satisfactory as to design and manufacture and are in proper alignment when fitted in place.

2—The necessity for more careful attention to lubrication.

3—In some cases, perhaps, a slightly increased starting effort.

4—Increased first cost.

These disadvantages are not very formidable and practically amount to merely requisite care in design, manufacture and lubrication. There are, however, several factors which contribute to or detract from the success of a worm-driving mechanism; the employment of suitable material is obviously important. So far as the worm wheel is concerned, the usual bronze composition would have about 10 per cent tin, though a higher working efficiency has been obtained with as much as 13 per cent or 14 per cent tin. The use of heavy journal bearings—either ball or roller—is very desirable to insure the maintenance of relative position of the two pitch circles. The employment of a satisfactory ball thrust bearing is of equal importance, the end thrust on the worm being, of course, a great one. The double-thrust bearing, as opposed to a pair of single-thrust bearings, on each end of the worm, is a deal more satisfactory. When thrust bearings are fitted in duplicate expansion of the worm due to heat, may, and, often in the past, has had a very bad effect upon these bearings.

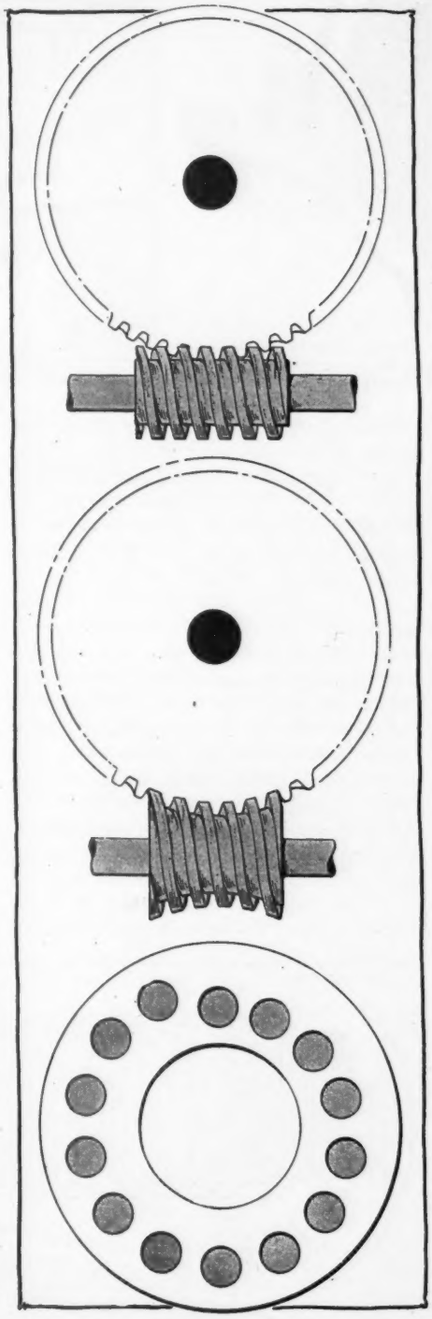


FIG. 2—THE STRAIGHT WORM

In this design the worm is straight from end to end, keeping a uniform diameter throughout its length

FIG. 3—THE CONCAVE WORM

In this design the worm shown in the shaded portion is concaved so as to adapt itself to the curvature of the wheel

FIG. 4—THRUST BEARING FOR WORM DRIVE

In this suggested type of bearing the balls are staggered, which gives beneficial results

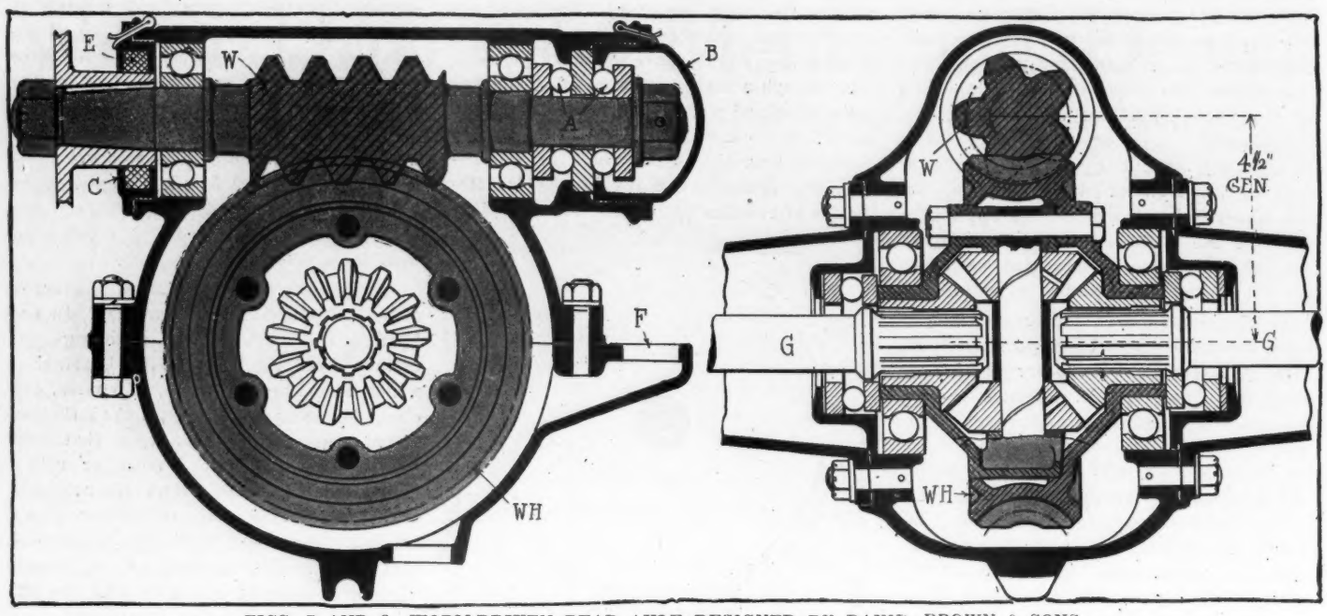
An excellent type of thrust bearing is employed on the Lanchester cars. In this bearing the balls, instead of being equidistant from the axis of the bearing, in which case the balls have, of course, precisely the same circular path upon the two thrust washers, are placed so that each ball is slightly further from or nearer to the bearing center than its neighbor. Fig. 4 shows the cage of such a thrust bearing. It is clear with this construction that the wearing surface of the thrust washers is greatly increased and the efficient life of the bearing lengthened.

Although, as before stated, the quietness of the worm gear is but little affected by wear, yet it is of importance that the parts should possess long life, and a recorded life of 60,000 miles has been reported. It is by some considered that this is not by any means exceptional, so that the excellent wearing qualities of this gear when correctly designed and efficiently lubricated are seemingly proved.

There are some who consider that the concave worm, Fig. 3, has not any really great advantage over the straight one, Fig. 2, for, although at first sight the area of bearing surface appears to be greater in the former case, yet if the angle of the center compared with the outside be considered, the difference owing to varying diameter is considerable, and the longer the worm the greater does this become. However this may be, there is no doubt that the straight worm can be ground after hardening where the hollow type cannot, and the attainment of glass smooth rubbing surfaces, as before pointed out, is of very great importance.

Other essential points in connection with worm-drive design are the use of a worm wheel of good, stout construction and having plenty of metal in its rim. The severe strain put upon the worm wheel by its worm in driving, tending to twist the wheel rim in regard to its boss, is not always as well appreciated by designers as it should be. Also the use of large ball thrust bearings on either side of the worm wheel to prevent any possibility of the wheel becoming out of line with its driving worm; there are as well other points which, perhaps, have more bearing upon the question of actual tooth-form design—a question which it is not intended to discuss in an article which has mainly for its object the comparison of the two driving methods—the worm and the bevel wheel.

In Figs. 5 and 6 are shown sections of a



FIGS. 5 AND 6—WORM-DRIVEN REAR AXLE DESIGNED BY DAVID BROWN & SONS

worm-drive rear axle, as designed and built by Messrs. David Brown & Sons. Fig. 5 shows a longitudinal section and Fig. 6 a cross section. The design is suitable for a car of from 9 to 11 horsepower. The construction is clear from the drawing without any lengthy verbal description, but a few remarks may perhaps be made with reference to some details. A very substantial double ball-thrust A is placed at the rear of the wormshaft and this thrust is particularly accessible for examination or replacement, in case of need, by removal of the screw retaining cap B. The locking of this cap is by split pin. At the forward end of the wormshaft is a light screwed cover C to prevent oil leakage and to exclude dust. This cover has a deep groove containing felt E and should prove efficient for its purpose. An oil filler F is placed at the back of the gear casing in a particularly convenient position. Referring to Fig. 6 it will be seen that the driving shafts G are castellated where they enter the bevels of the differential, so that these shafts can be withdrawn without internal interference. The wormwheel WH itself is a casting of rigid form and constitutes part of the casing for the differential gear; in comparatively small axles as this such an arrangement may be considered quite a satisfactory one. The journal ball-bearings fitted on the wormshaft are large ones, and it is interesting to note that the designers of this axle, who, as has been stated, have great experience in all classes of worm drive, have been satisfied to place the worm W over its wheel.

Fig. 7 shows a worm-geared axle suitable for a 2-ton truck designed and constructed by the same firm as the last described axle. It will be seen here that there is not any central joint in the axle casing, but the upper part H of the casing which holds the wormshaft and bearings is detachable. This construction lends itself to greater strength perhaps than is possible in the case of the light axle just described. Beyond this constructional detail there is not much to comment on.

Figs. 8 and 9 show sectional views of a well-designed worm-driven axle by Messrs. Henry Wallwork & Co., of Manchester. The worm W is here, as in the two axles

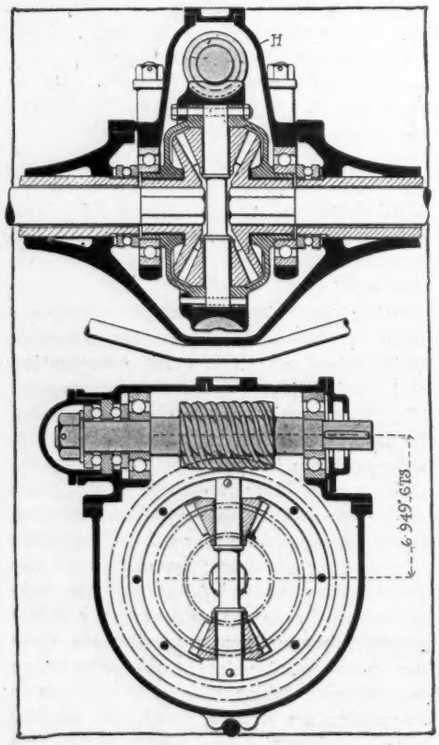


FIG. 7—WORM-DRIVEN TRUCK AXLE

This axle is intended for a 2-ton truck and has the worm located above the wheel. The housing H carrying the worm shaft with bearings is readily detachable

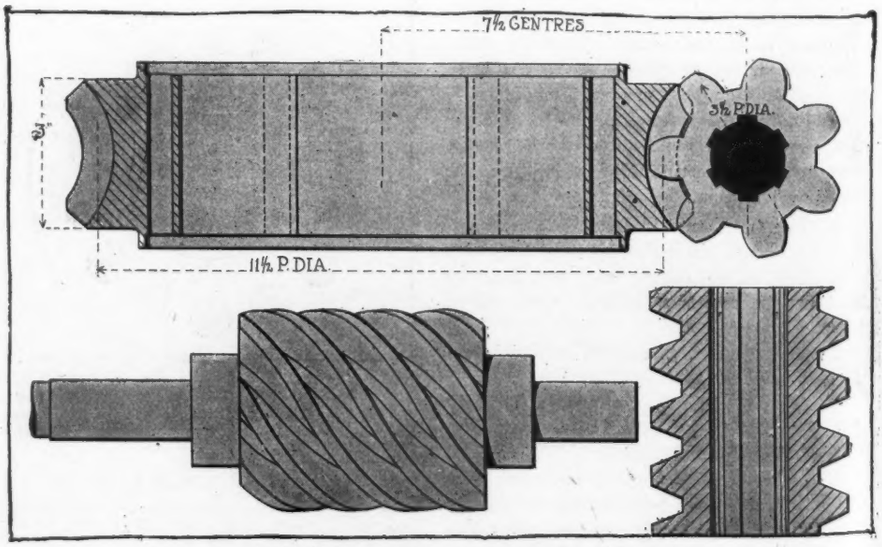
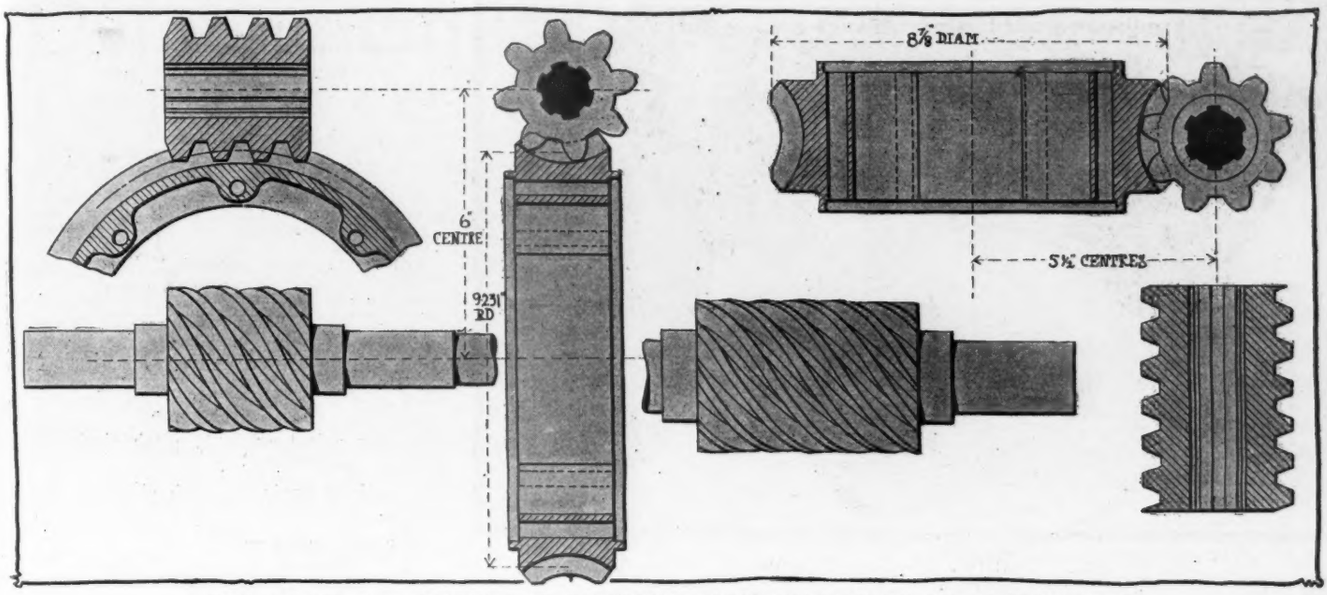


FIG. 9C—WORM-AND-WHEEL DESIGNS BY WALLWORK

In this design the worm is of the straight type, of uniform diameter from end to end and is carried on a six-broach shaft, a type of shaft that is becoming very popular for worm-drive use as well as for use in gearboxes of cars in place of the conventional shaft with keys or the square type of shafting often used.



FIGS. 9A AND 9B—EXAMPLES OF WALLWORK WORM-DRIVE DESIGN FOR TOURING CARS

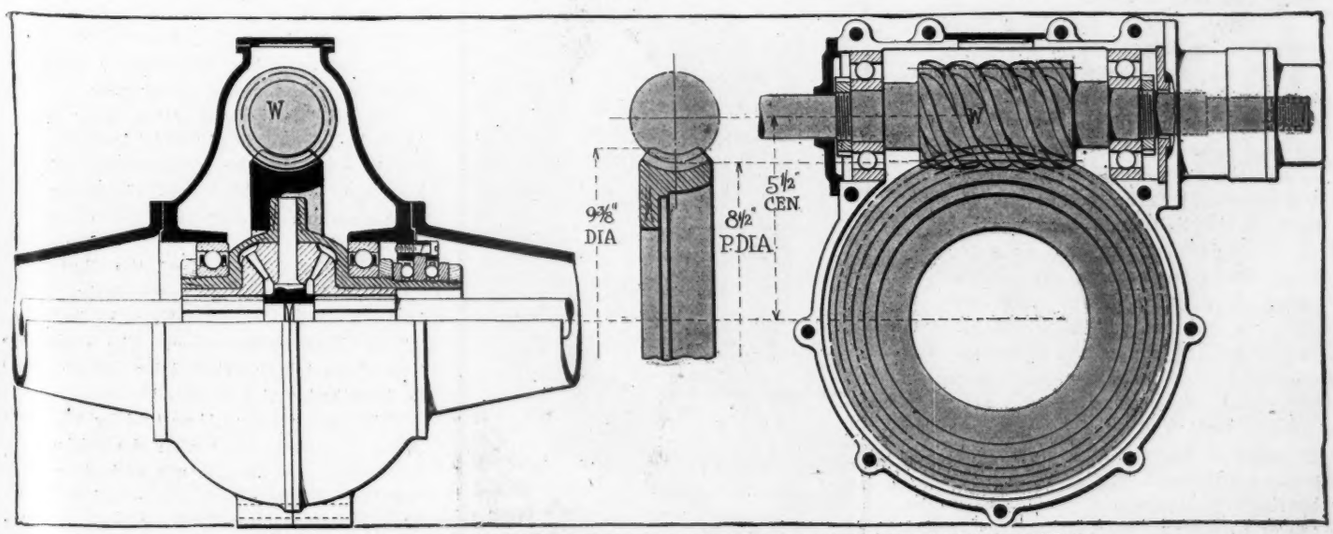
just described, a straight one, and it is supported by two fairly heavy journal bearings, Fig 9. The thrust bearing is situated at the rear end of the wormshaft in a detachable housing. The casing is divided vertically and is designed so as to be free from corners and cavities where dirt might collect. The thrust bearing, Fig. 8, to prevent end motion of the worm wheel, it should be noted, is a double one. The axle in this respect is not similar to the one previously described, where single-ball thrusts in duplicate are fitted, one to take the forward going thrust and the other to take the rear going thrust. Here again the worm is placed over its worm wheel. Figs. 9A, 9B and 9C show examples of work designed and manufactured by Messrs. Wallwork.

It is believed that the Lanchester worm-driven axle provides a higher efficiency than any other on the road and this axle, of which a sectional view appears in Fig. 12, displays several points of interest, points which are not embodied in any of the types so far described. The worm itself is a hollow one of the type shown diagrammatically in Fig. 2: the journal bearings on the wormshaft are roller bearings and the worm and its shaft are placed below the worm wheel.

On referring to the illustration it will be seen that the forward or driving end of the wormshaft is supported by a roller bearing A of very heavy construction, and the tail end by a second roller bearing B of less diameter and lighter construction. A single ball thrust bearing C receives the thrust of the forward drive and a series of steel disks D take the thrust during the very brief period of time that the reverse gear is in action. The worm W_1 which it will be realized is submerged in lubricant at all times, gives an efficiency of from 85 to 87 per cent when in new condition and the efficiency actually increases after a certain amount of running. The Lanchester company holds the opinion that a well-worn worm gives an efficiency of something like 90 per cent, which, having in view the excellent machinery used in the construction of the worms and the first-class design embodied, does not appear to be at all an unreasonable statement.

Fig. 11 gives a very good conception of the form of worm and wheel in use on the Lanchester cars. By a close examination it can be gathered, indeed, that considerable surface is opposed to the thrust at all times, so that under the very satisfactory state of the lubrication conditions a life of 60,000 miles, as before mentioned, does not appear in the least impossible. The worm W is made of mild steel carbonized and hardened and the worm wheel WH of a hard alloy of phosphor bronze, which undergoes special treatment in the hardening process.

Fig. 10 shows a rear view of a Lan-



FIGS. 8 AND 9—WALLWORK WORM-DRIVEN AXLES WITH WORM LOCATED OVER WHEEL

In Fig. 8 the use of a double thrust bearing is shown to the right of the worm wheel and in Fig. 9 is shown a detachable housing at the rear end of the worm shaft and in which the thrust bearing is carried. The use of non-adjustable annular ball bearings to carry the radial load of both worm and wheel is universal in this design of axle

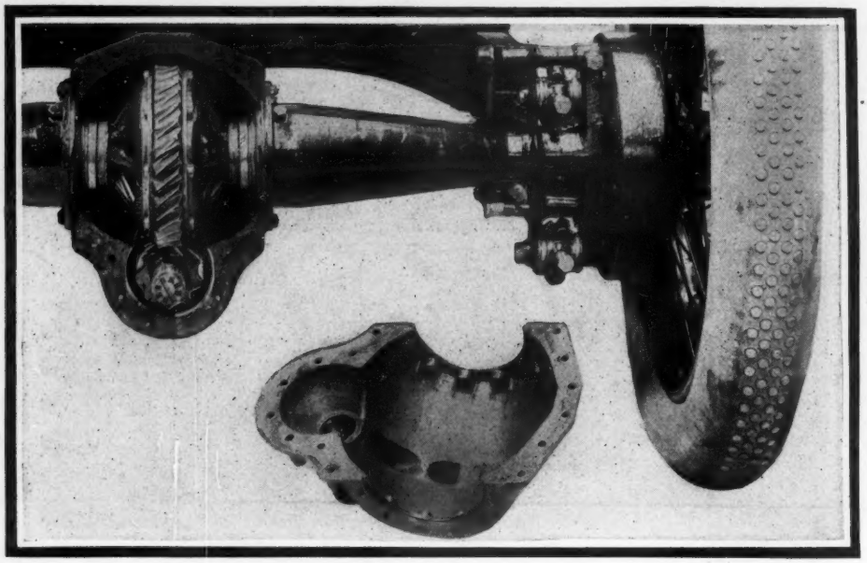


FIG. 10—REAR AXLE OF LANCHESTER WORM-DRIVEN AXLE

chester 38-horsepower back axle, a portion of the casing being removed to display the internal parts to better advantage. This construction permits a thorough examination of the worm and its wheel, without disturbing bearings, and is therefore very advantageous.

One or two inventors have endeavored to produce worm change-speed gears, in which a series of worms are arranged to gear with one or more worm wheels. The advantage, of course, is that a direct drive is obtained on all speeds, and there is in consequence a great degree of silence on all speeds. The gear invented by Mr. Buch is an example of this type, which is of very peculiar construction and has two worms and three form wheels. One worm is adapted to operate the second and third speeds and the other the first and reverse speeds. The axle arrangement is very ingenious, but it is doubtful whether at the present time the efficiency of the mechanism has been really proved.

Some Efficiency Schemes

A number of inventors have made attempts to improve worm efficiency by such contrivances as rollers to replace the worm teeth, the interposition of balls between the worm teeth and the worm and such like devices, but it is uncertain whether any of these methods of lessening friction will ever find favor on account of their lack of simplicity and therefore liability to break down. It appears in conclusion that those manufacturers who are considering the adoption of the worm must, if they seek success, pay strict attention to such considerations as the following: The employment of first-class gear generating machines; the use as material of high quality steel and phosphor bronze; the grinding of the surfaces in contact; the perfect alignment of the parts and rigid bearings, etc., to retain the alignment; the use of thrust and journal bearings of ample strength; and, finally, without which all the above are superfluous, careful attention to the lubrication of the rubbing surfaces, such as are inseparable from the worm method of transmission as used in the motor car.

After describing and discussing in some detail a few of the well known worm drive axles it may, perhaps, be useful to set down a series of formulas used for worm gear design which has been kindly supplied by Messrs. David Brown & Sons, the old established and well-known firm of gear cutters, of Huddersfield. These equations for worm-gear design will serve as a useful guide to those intending to design worm-driven axles and who have been studying them.

Formulae for Worm Gear

$$\text{Linear pitch of worm} = \frac{\text{Lead}}{\text{Number of threads}}$$

FIG. 11—LANCHESTER WORM AND WHEEL

or linear pitch of worm = circular pitch of wheel.

$$\text{Circular pitch of wheel} = \frac{\text{Pitch circle circumference}}{\text{Number of teeth}}$$

$$\text{or} \quad \frac{\text{Pitch circle diameter}}{\text{Number of teeth}} \times 3.1416$$

Normal pitch = linear pitch × cos. lead angle.

Lead = number of threads × linear pitch.

$$\text{or} \quad \frac{\text{Pitch circle circumference}}{\text{Cotan lead angle}}$$

$$\text{or} \quad \frac{\text{Pitch circle circumference}}{\text{Tan spiral angle}}$$

or cotan spiral angle × pitch circle circumference,

or tan lead angle × pitch circle circumference.

$$\text{Cotan lead angle} = \frac{\text{Pitch circle circumference}}{\text{Lead}}$$

or cotan (90 — spiral angle).

$$\text{Tan spiral angle} = \frac{\text{Pitch circle circumference}}{\text{Lead}}$$

or tan (90 — lead angle).

$$\text{Tan linear thread angle} = \frac{\text{Tan normal thread angle}}{\text{Cos lead angle}}$$

Tan normal thread angle = tan linear thread angle × cos lead angle.

Addendum = normal pitch of worm × .3183.

Dedendum = normal pitch of worm × .3683.

MOTOR CAR LITERATURE

The recent strenuous Glidden tour is recalled by a booklet entitled "The Glidden Tour Winner," which the makers of the winning car—the Maxwell—are now distributing. The illustrations bring vividly to mind the gruelling experiences and hardships encountered by the Glidden contestants.

A. R. Mosler & Co. have a 9 by 17 enameloid calendar, the number pads of which can be renewed every year.

The SKF Ball Bearing Co., New York, in its bulletin entitled "SKF Radial Bearings" explains the construction of its bearings, with additional information as to dimensions, speeds and capacities of its leading types.

The artistic feature of the Rauch & Lang 1912 catalog is particularly pleasing and attractive, reflecting the imagery of the Flowery Kingdom. The complete line of electrics marketed by this concern is described and illustrated.

"A Vital Problem," as told by William Allen Johnston, deals with the subject of the warning signal, its use and abuse, its problems in cities and how to solve them. The Lovell-McConnell Mfg. Co., maker of the Klaxon horn, is distributing the booklet.

Determining Horsepower by Formula

By P. J. Keating

TO THE non-technical man, the problems met with in the effort to determine engine horsepower by formula seem most formidable, with a problematical outcome. Indeed, there is a large element of uncertainty in any conclusion arrived at by the use of either of the various formulae compiled for the purpose of determining horsepower by other than dynamometer or brake-load test.

The seeker for information on this subject usually is referred to the A. L. A. M., now the S. A. E., formula and in some instances to the English method of determining horsepower by formula. Both of these methods are based on the assumption that a certain average pressure is exerted on the piston during the length of its power or explosion stroke a certain number of times per minute. It is conceded that this is a rational method of mathematical determination, but it also must be conceded, that of two engines with equal piston diameters and length of stroke, having the same average pressure, termed mean effective pressure, and running at the same speed, one may develop a greater power on the crankshaft than the other, possibly by reason of the more immediate and direct crank-turning effect of the high-explosion charge in the offset cylinder engine, or it may be that the exhaust valve on one engine is larger, or by reason of a better cam design, may have a more rapid opening than the other, thus allowing a free escape of the burned gas from the cylinder and the consequent reduction of back pressure on the piston during the exhaust stroke.

Within the last year good results have been obtained in this direction by the use of a peculiar design of exhaust manifold which gives a jetting action to the exhaust gases, whereby it is claimed that a more complete scavenging action in the cylinder is obtained during the exhaust stroke, thus insuring a larger volume of fresh gas during the inlet stroke.

In checking up the list of horsepower ratings for the various cars it is evident that a mean effective pressure of about 70 pounds has been considered. The standard horsepower is equal to the work of raising 33,000 pounds 1 foot in 1 minute, in other words, 33,000 foot-pounds per minute. If then the area in square inches of a piston is multiplied by the mean effective pressure exerted upon it during the power stroke, and this result multiplied by the feet per minute speed of the explosion strokes and divided by 33,000 pounds, the result will be the theoretical or cylinder horsepower.

The S. A. E. formula is based on a piston speed of 1,000 feet per minute, and in a four-cycle engine, if a piston travels 1,000 feet, one-fourth of this amount or 250 feet is traveled under the pressure exerted by the exploded charges, hence the area of the piston in square inches multiplied by 250 feet multiplied by the mean effective pressure and divided by 33,000 give the horsepower. But, the average man will say, "How do we know what mean effective pressure on which to figure?" And, of course, this information could be only obtained from an indicator diagram taken from the cylinder of the engine. But the 4½ by 4½-inch engine in the Rambler cross-country car is being rated by the S. A. E. formula at 32.4 horsepower, and by the Rambler people at 38 horsepower. It is evident that each is figuring on a different mean effective or power pressure, and to arrive at this pressure by formula the following is given:

$$\frac{33{,}000 \times \text{H. P.}}{\text{Piston area} \times 250} = \text{M. E. P.}$$

By this formula 32.4 horsepower requires a mean effective pressure of about 67 pounds, and 38 horsepower, a mean effective pressure of about 80 pounds. When mean effective pressure in a four-cycle engine is talked of, the pressure required to do the work of compression is not here considered, only that pressure that exerts a net power effect on the crankshaft is considered.

The Pierce-Arrow, 4½ by 5½ six-cylinder is rated at 48.6 horsepower. This is arrived at as follows: The area of the 4½-inch piston being 15.9 inches approximately, the following works out the horsepower; 15.9 inches multiplied by 67 pounds, multiplied by 250 feet, divided by 33,000 pounds, equals 8 horsepower plus, for one cylinder, this multiplied by six gives about 48.6 horsepower.

To travel 1,000 feet per minute per piston and develop its rated horsepower, the 4½ by 4½-inch engine makes about 1.333 revolutions, and the power developed open in a cylinder of this size in each revolution equals

$$\frac{38 \text{ H. P.}}{1{,}333} = .285 \text{ H. P. per revolution.}$$

The 4½ by 5½ engine travels 1,000 feet in about 1,095 revolutions, and

$$\frac{48.6}{1{,}095} = .443 \text{ H. P. per revolution.}$$

Another car with a 5 by 5½-inch 4-cylinder engine is rated by its maker at 48 horsepower, and by S. A. E. rating at 40 horsepower. In the former case, 80 pounds M. E. P. is figured on, and in the latter 67 pounds M. E. P. is the power-producing factor. It is evident that it should be safe to assume a mean effective pressure half way between these two extremes, say, 73 pounds, then $5'' \times 5\frac{1}{2}'' \times .7854 = 19.62$ piston area, and

$$\frac{19.62 \times 73 \times 250 \text{ feet}}{33{,}000} = 10.8 \text{ H. P.}$$

for one cylinder; this result multiplied by four—the number of cylinders—gives 43.2 horsepower at 1,000 piston speed per minute. All the foregoing figures are based on a piston speed of 1,000 feet per minute. If any other speed is to be considered, simply divide it by four and use the result in place of 250. At the first glance it would seem that the length of the stroke of the piston is not taken into consideration, but a moment's thought will show that it does become effective in the 250.

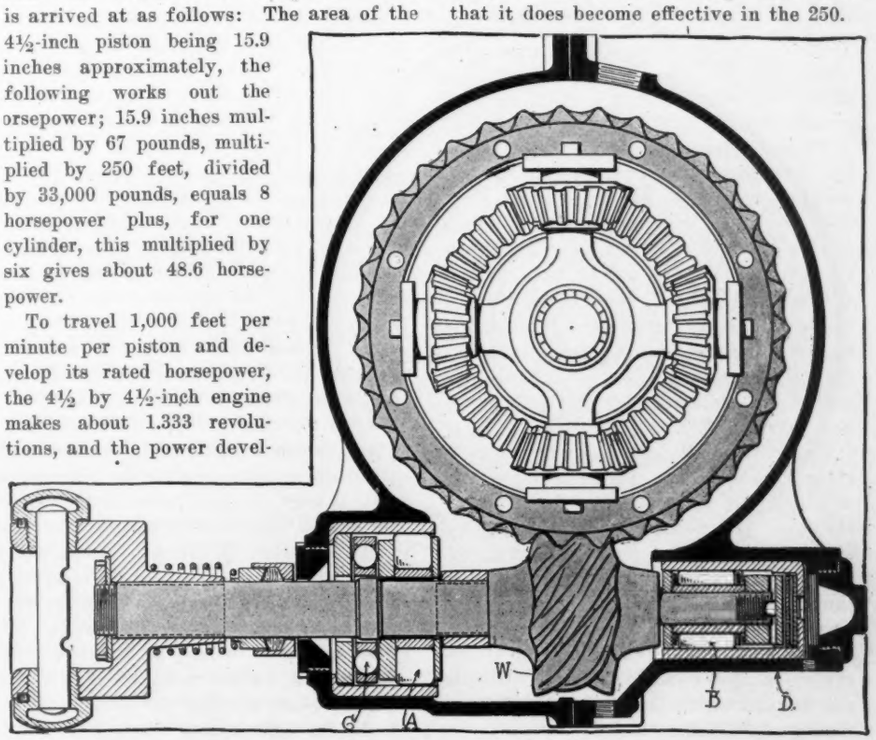


FIG. 12—SECTIONAL ILLUSTRATION OF THE LANCHESTER AXLE

In this axle attention is drawn to the use of roller bearings A and B for carrying the worm shaft as well as the mounting of the worm beneath the wheel, a design which makes the lubrication problem an easy one

All Cars in the Dominion Are Counted

Government Reports Show There Are Approximately 15,000 in Service With Toronto the Stronghold of Motoring— Advice Given Americans Who Contemplate Touring in Canada

TORONTO, Feb. 19—Compilers of government reports in Canada have, most unfortunately, so jumbled motor cars and parts in their tables of statistics that it is difficult to disentangle the skein and arrive at exact figures. Up to the beginning of the present year there were, approximately, 15,000 motor cars owned and operated in all Canada. Of these, 2,646 were owned in Toronto, which is the largest patron of the motor car in Canada, owing to its fine streets and fairly good suburban roads. Montreal followed with some 500 cars. Although the population of Montreal exceeds Toronto by 100,000 and there is comparatively greater wealth, the natural surroundings, the hilly and dirty streets, and the abominable highways along the water front, as well as in every other direction, offer none of the attractions presented to the motoring enthusiast in Toronto.

Roads Need Fixing

It will be useless to look for Montreal to be an enthusiastic motoring center until there are radical improvements in streets and highways. Hamilton owned in the neighborhood of 420 cars, mostly of the pleasure type. No other city of Ontario was shown to own above 100 cars. Canada imported over 6,000 cars last year, on which the duty was approximately $10,200,000. This was more than $3,000,000 more than the duty collected on cars by the Canadian customs in 1910.

Up to September 1, 1912, when the motor car license department of the Ontario government issued its semi-annual statemet, there had been issued 11,730 licenses in this province. Of this number, no fewer than 2,201 were issued to American tourists and others who reside close to the border, as at Detroit and Buffalo, who take out licenses for frequent short pleasure trips across the border. From this source the Ontario government collected last year $46, 920.

The Ontario officials make no effort to classify the various cars in their reports, although the trade name and a full description are demanded in the printed forms of application for registration; but it is estimated that in Ontario the percentage of American-made cars is about 70 per cent; of cars assembled in Canada 29 per cent, and of foreign cars 1 per cent. In the Canadian west, Winnipeg and beyond as far as the coast, the percentage of American cars is fully 80; with foreign cars eliminated. The Ford car has the call in Canada for popularity, with the McLaughlin second, Russell, E-M-F, Reo and Tudhope following. Others, among them the Cadillac and the Packard, have many warm admirers, and these cars above named seem likely to maintain their popularity. Their prices for touring and other cars catch the popular Canadian fancy, which is one reason why the English high-priced car will be a long time getting much favor here. The other reason is that the English-built cars are not as well adapted for the Canadian roads as they are for the smoother and better-kept highways of the old country.

Local sales managers say that there will be a very large increase in the number of cars owned in Toronto this year. They report more business in January than ever before, and in some cases the Toronto agents declare that their entire allotment of cars for 1912 has been placed already and that they have little expectation of getting any more cars this season unless the contemplated output is largely increased. This condition is general over western and southern Ontario, and a conservative estimate of new business for the year is 50 per cent over 1911.

American tourists who desire to include Canada, or any part of it, in their itinerary should be very careful to take the precaution of observing the provincial regulations. Every province makes its own laws governing the operation of motor cars on the highways and they are mostly in harmony in placing the motorist at a disadvantage. It should be borne in mind that no car may be taken across the international frontier—either way—except at points where the two countries maintain customs houses or have other facilities for the appraisement and collection of duties. And without the necessary license and credentials authorizing him to drive on foreign roadways, trouble is almost sure to follow.

Tips for Tourists

Mechanical equipment is of no more consequence than the legal necessaries when a tour of Canada is contemplated. The tourist first should address the provincial secretary of the province in which he wishes to travel, or if his itinerary carries him across Ontario into another province he must be provided with a license for each province he purposes traversing. The license must be in his possession before crossing the border, and it should be remembered that last year's license and markers are wholly useless.

Regulations as to customs duties are readily obtained at crossing points where there are customs houses. The fee for an Ontario license is $4. The customs demands a bond for double the estimated duties and a personal deposit of $25. On payment of $4 the tourist will receive a permit and duplicate report with receipt for the deposit endorsed upon it. The deposit will be returned at the same port of entry upon return of permit with proof of the exportation of the motor car within the period of 3 months. The laws against speeding are very strictly enforced in Canada, and they vary somewhat in the various provinces, and in different localities. In Ontario it is unwise to take any chances in the evading of the absolute text of the laws, for any person is authorized to act as constable and hale the law breaker before the nearest justice of the peace. There is much antagonism to motor cars in rural Ontario, and the wise tourist will adhere to the strict letter of the law.

Canadian Speed Limits

In Ontario the speed limit is 15 miles in rural districts, 10 miles in cities, towns and villages. The regulations in Quebec fix the country limit at 15 miles, towns and municipalities governed by Municipal Code, 9 miles, and 4 miles for sharp curves, bridges, steep descents, crossings and intersections. The regulations for New Brunswick and Nova Scotia are pretty much alike and practically the same as the Quebec laws. No tourist in Canada should overlook the regulation requiring front and rear lights. These vary in different provinces but if the car carries two white lights in front and one red in the rear, the tourists will satisfy all the requirements in this direction anywhere any everywhere in Canada.

Should a car owner wish to cross the border into Canada, intending to remain within the limits of the port of importation for a period not to exceed 1 week, the collector of customs may allow the outfit to cross, subject only to the usual search, neither bond nor deposit being required. But this is where the tourists are personally known to the officer in charge of the port.

There are garages in every place of any size in Ontario, where supplies of every sort are purchasable.

FOUR-WHEEL DRIVE IN TEST

Washington, D. C., Feb. 19—Through an unfortunate error the fact that a four-wheel-drive car, owned by the government, was participating in the army test between Washington and Fort Benjamin Harrison, Indiana, was not mentioned in last week's issue. The Four-Wheel Drive machine started with the White and Sampson trucks, also government owned cars, as well as an autocar which is privately owned.

Minnesota Farmers Buying Many Cars

Statistics Compiled in Gopher State Show an Increase of 225 Per Cent in 2 Years in Use of Motor, With Bulk of Sales in the Rural Communities —Instances Are Cited

MINNEAPOLIS, Minn., Feb. 19.—Claim is made by the Farmer, a St. Paul publication, that the residents of the rural districts of Minnesota are the largest buyers of motor cars in this commonwealth and in support of its contention it has compiled interesting statistics which divide the towns in the state into classes according to population and shows both the total number of cars and the number of each individual make for each class of towns.

The report was compiled November 1, 1911, when there were 17,561 cars in Minnesota as against 6,282 on November 1, 1909, an increase of 255 per cent in 2 years, the gain being in the rural districts mostly. The count shows that on November 1, 1911, there were 5,760 registered from towns of under 1,000 population; 2,249 in the 1,000-2,000 class; 1,014 in the 2,000-3,000 class; 432 in the 3,000-4,-000; 222 in the 4,000-5,000; 265 in the 5,000-6,000; 404 in the 6,000-7,000; 132 in the 7,000-8,000; 100 in the 8,000-9,000; 194 in the 9,000-10,000; 742 in the 10,000-20,000; 6,138 in the 20,000 and over.

As examples of how the rural communities are supporting the motor industry a list of towns and their populations, together with an explanation of the industries supporting each is given. For instance, Bemidji, 5,099 population, and supported by lumber and mining, owns twenty-six cars; New Ulm, 5.648, farming, ninety-six; Owatonna, 5,658, dairy farming, 148; Little Falls, 6,078, lumber, fifty-four; Albert Lea, 6,192; dairy farming, 154; Fergus Falls, 6,887, farming, 108; Austin, 6,960, farming, eighty-seven; Eveleth, 7,036, mining, seventeen; Crookston, 7,599, farming, eighty; Rochester, 7,844, dry weather for 2 years, thirty-two; Brainerd, 8,526, lumber, thirty-eight; Hibbing, 8,832, mining, fifty-seven; Faribault, 9,001, farming, 111; Red Wing, 9,048, small farming area, seventy-eight; Stillwater, 10,198, small farming area, fifty-six; Mankato, 10,356, farming, 257; Virginia, 10,473, mining and a few farms, fifty-one; St. Cloud, 10,600, farming, 171; Winona, 18,583, farming, 231.

As giving an idea of how the cars are selling in Minnesota is the list which shows that November 1, 1911, there were 2,719 Fords in the state, 948 E-M-F's, 935 Overlands, 930 Maxwells, 740 Cadillacs, 321 Mitchells, 321 Chalmers, 295 Brush and 293 Ramblers.

DETROIT LUKEWARM ABOUT TOUR

Detroit, Mich., Feb. 17—Apparently there is no disposition on the part of the Detroit motoring interests to take up the suggestion of the American Automobile association that the national reliability tour for 1912 start from this city. The subject was discussed at the meeting of the runs and tours committee of the Wolverine Automobile Club last week, but no action was taken. The Detroit Automobile Dealers' Association has done nothing to stir up interest in the matter and is not likely to take any.

The condition of the roads outside of the city, particularly those leading to Toledo probably is the princapal reason for this apathy. The club and association officials feel that, if the start were to be made from Detroit, it would be absolutely imperative to fix up the Toledo road and there is no chance of securing any action to this end before June. And so the W. A. C. and the D. A. D. A. have practically thrown up their hands and are exclaiming in unison: "What's the use?"

On the other hand, a movement to secure a national dealers' show for Detroit early in October, 1913, is receiving enthusiastic support. Fred Postal, hotel man and motor car manufacturer, who formerly was president of the Michigan State Agricultural Society, suggests that the show be held at the state fair grounds and that it be made an annual event.

"There is not an obstacle in the way of such a plan, as far as I can see," said Mr. Postal. "The state fair will be over and the buildings will all be available for the use of the show. They will provide ample accommodations for the exhibits and nobody would be cramped for room either. The roads about the grounds are fine for driving, and there is a ½-mile track that could be used for demonstrations. I believe such a show would attract no fewer than 10,000 agents from all parts of the country. Let's have it by all means."

HOOSIERS PLAN ANOTHER TOUR

Indianapolis, Ind., Feb. 19—Plans for another four-states tour were discussed and a tentative route outlined, at the annual meeting and election of officers of the Indiana Automobile Manufacturers' Association held in this city last Tuesday night. The meeting was held in the rooms of the Hoosier Motor Club in the Claypool hotel and a buffet luncheon was served.

The route outlined is through Indiana, Kentucky, Ohio and Pennsylvania, is about 1,300 miles long and it is estimated that from 12 to 13 days should be taken to cover it. It starts in Indianapolis, going north to Peru, then through Fort Wayne, Defiance, O., Sandusky, O., Akron, O., Canton, O., Youngstown, O., Erie, Pa., Pittsburgh, Pa., Steubenville, O., Marietta, O., Portsmouth and Lexington, Ky., thence north to Indianapolis.

Former officers were re-elected as follows: President, Frank H. Smith of the Maxwell-Briscoe Motor Co., Newcastle; vice-president, Will H. Brown, president of the Mais Motor Truck Co., Indianapolis; secretary, J. M. Ward, of the Waverley Co., Indianapolis, and treasurer, Fred N. Coates, of the Lexington Motor Car Co., Connersville. The following directors were elected: E. M. McMorris of the Great Western Motor Car Co., Peru; H. H. Rice of the Nordyke & Marmon Co., Indianapolis; George M. Dickson of the National Motor Vehicle Co., Indianapolis.

PIGGINS IN TRUCK BUSINESS

Racine, Wis., Feb. 19—The incorporation of the Piggins Motor Truck Co., with a capital stock of $125,000 marks the evolution of a well-known manufacturer of motors as a large builder of commercial vehicles. Many years ago, C. B. and F. H. Piggins, brothers, started the manufacture of gasoline engines and specialties. Three years ago they had become big makers of truck and pleasure car motors. For some time past they have been building complete cars and trucks and now have decided to devote all of their energy to the production of trucks. The factory and machine shops will be enlarger considerably.

INSURRECTOS STOP PATHFINDERS

Los Angeles, Cal., Feb. 17—With their goal almost in sight, Chester Lawrence and T. J. Beaudette, who are pathfinding the Pacific highway from Los Angeles to the City of Mexico, have been held up by insurrectos, and their lives threatened and otherwise annoyed so that their trip has been abandoned on authority of the Los Angeles Examiner, under whose direction Lawrence is working.

This information was received at the headquarters of the Pacific Highway Association in a telegram which did not state whether or not the pathfinders would be able to bring their Cadillac car out of the country or not. The chances are that the car will have to be abandoned.

HERRICK A CASE DRIVER

Racine, Wis., Feb. 20—Harvey Herrick, road champion of 1911, has been signed to drive a Case this year. He will be a relief driver in the Indianapolis race and also participate in the Pacific coast road races.

Favors the Light Car

Pratt, Kas., Attacks Dixie, Wash., on Claimed Advantages Over the Heavy Ones

PRATT, KAS.—Editor Motor Age—In answer to Paul Tonney of Dixie, Wash., in Motor Age of February 8, entitled "Believes in Heavy Cars," I wish to say that my first conclusion is that he never has driven an up-to-date light car or he would have omitted many things he said. He says if the motor cycle was made heavy enough to stand the knocks and bumps that a motor car must stand, and be provided with as much comfort, it certainly would be as heavy as a motor car according to the load it carried. We will leave it to the readers if at from 70 to 80 miles an hour, which motor cycles sometimes make, they did not stand the knocks, especially so far as weight is concerned. Then he goes on to say that to sum the whole thing up the heavy car does not take many more tires. This statement is so far from true that it hardly needs answering.

I have had 5 years of continuuous experience in the motor car livery business, driving during that time eighteen different makes of cars, and I want to say frankly that his 3,400-pound car will use $4 worth of tires while the 1,500-pound five-passenger car uses $1 worth of tires in the same number of miles over the same kind of roads. I know this is true, for I have tried it. He also says the upkeep would be much less on the heavy car that is strong enough to stand the wear and tear that it must stand. I would like to ask how many cars we observe being broken down because of their light weight? I never have seen one.

Then he considers the big car preferable from point of safety. I do not grasp what he means by that, for a light car is much easier handled in times of danger, can stop quicker, start quicker and turn shorter.

He says that as our highways are improved the matter of weight is of less importance, which is true, and argues pretty strongly for the light car. They all do well on good roads, it is the bad roads that give us our grief; and he admits in his remark that the light car does better on poor roads than the heavy car. He cites the heavy foreign cars as evidence, and in the next sentence says he thinks the foreign-built cars are no better than those we build.

Further, in the matter of upkeep, that consists principally of tires and gasoline on any car that is built right and handled right. The gasoline consumption of his 3,400-pound car is between 8 and 14 miles to the gallon, the 1,500-pound car's consumption is between 25 and 30 miles to the gallon. The repair bills on a car that is built of the right kind of material, and is of good workmanship, depend principally on who is handling the car. The heaviest repair bills I have had during the past 5 years have been on heavy cars, caused by carelessness.

I would like to ask this question: If weight is the desirable thing, why do all the manufacturers without exception, and who ought to know if anyone does, catalog their cars from 200 pounds to 500 pounds lighter than the scales show.

I heartily agree with the many recent expressions through the Readers' Clearing House pages that retreading does not pay and have come to the exact conclusion of John A. Schneider—add the difference to the cost of retreading and buy new tires.—J. W. Farmer.

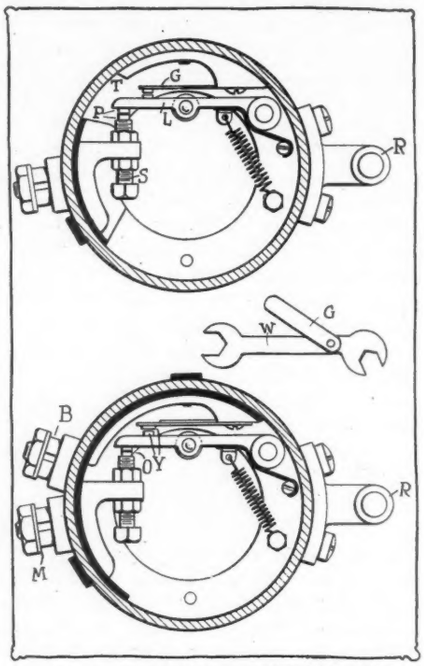


FIG. 1—SPLITDORF DISTRIBUTERS

The Readers' Clearing House

The Weight Question Discussed—Effect on Motor Tires—Origin of Pushmobile—Preventing Top Leaking—Throttle Adjustment

ORIGIN OF PUSHMOBILE

Indianapolis, Ind.—Editor Motor Age—A dispute has arisen as to what country or city first originated the pushmobile. The writer claims it originated in France or England some 2 years ago, and if not mistaken, the writer thinks he read of it and saw illustrations of it in an issue of Motor Age. Kindly give full information. —A. T. Purcell.

The pushmobile has been popular among small boys in America motoring circles for 2 or 3 years. So far as Motor Age knows, neither France nor England uses them.

Water-Proofing Car Tops

Triple Boiled Linseed Oil, or Balloon Makers' Varnish Does the Trick

EAU GALLIE, Fla.—Editor Motor Age—On November 16 Motor Age published a letter from me regarding leaking mohair tops. I have had so many inquiries on the subject since then that I would like to answer all of them through the Readers' Clearing House columns.

At the end of the first year my mohair top began leaking and, after various inquiries, I was advised to try balloon makers' varnish. I ordered same from the Peaslee-Gaulbert Co., Louisville, Ky., and that concern sent me a can labeled "Triple Boiled Linseed Oil." I gave the top a coat, using a wide brush and spreading it as evenly and quickly as I could; letting this dry for a day or so, I applied another coat and the top has not leaked since. That was about August, 1910.

I do not know what the effect would be upon this coating if the top were raised and lowered, as I always leave mine up. It might be necessary in cold weather to allow a longer time for drying before the second coat.—C. W. Fowler.

ADJUSTMENT TOO TIGHT

Neodesha, Kan.—Editor Motor Age—Please answer through the Readers' Clearing House the following: I have a two-cylinder opposed 15-horsepower engine, which will start in the usual way with spark retarded and throttle open part way, and the engine runs all right, but when the spark is advanced the throttle cannot be opened any farther than when starting, as it seems to choke the engine and stop it. Also when the throttle is open a whistling sound is heard until the engine stops. The carbureter is a Schebler, model D.—Confused.

Your trouble may be due to the fact that the air valve spring is too tightly adjusted, so that it does not open sufficiently when the motor is speeded up; thus the mixture becomes too rich in fuel and too poor in air. It also is possible that the spring has been compressed to such an extent that it no longer is serviceable. If this is the case, remove and stretch it a trifle, then adjust so that the air valve just seats lightly. This adjustment may be altered slightly after the motor has been started.

Clearing House

Proper Adjustment for Platinum Points of Magneto—Home-Made Master Vibrator Inefficient—Argues in Favor of Motor Car Races

Splitdorf Magneto Query

Difference in Distributers Perplexes—All Contacts Are Not Electrical

SHELBYVILLE, Ill.—Editor Motor Age—Through the Readers' Clearing House will Motor Age kindly answer the following?

1—I have two Mitchell cars, one a six-cylinder and the other a four-cylinder. Both cars are equipped with Splitdorf magnetos and coils. The four-cylinder car has a vibrating coil to start on and when it is switched to the magneto it is a non-vibrating coil. The six-cylinder car now has a non-vibrating coil. When I set the points in the breaker-box of the four-cylinder car so they will open 3/32 inch the little spring at the top of the lever that carries the roller has to be set so it will be about 1/64 inch from the contact point when the gap is closed. The engine runs fine this way and on the six-cylinder car this little spring is set so it is in contact all the time the engine runs, and does not miss on any speed. I want to know if this is right and why the difference. I had trouble until I set the points this way and have had none since. —Chauffeur.

You will notice that on the four-cylinder car with the combination vibrating and non-vibrating coil, there are two terminals, B and M, on the one side of the circuit-breaker box, as shown in Fig. 1. In this style of breaker-box, there are two sets of platinum points, one, O, for the magneto circuit, and the other, Y, for the battery circuit in which the vibrator is used. As you state, these points should be about 3/32 inch apart when full open, in order to give satisfactory service.

On the other magneto, you will find a circuit-breaker such as above shown in Fig. 1. This has but one set of platinum points, and but one terminal on the side of the breaker-box. There is, however, another pair of contact points T, which look very much like those of the other circuit-breaker, but these are not of platinum, and are not electrical contact points; they merely serve as contact pieces between the buffer spring G and the circuit-breaker lever L. This buffer is provided to accelerate the return of the lever when struck by the cam at high speeds. Generally the best results are obtained with this type of breaker box when there is about 1/64 inch space between the buffer spring points, while the platinum contact points are closed.

MAKING A MASTER VIBRATOR

Ordway, Colo.—Editor Motor Age—I attempted to construct a master vibrator for a four-cylinder car using multiple-coil and battery ignition, but did not have

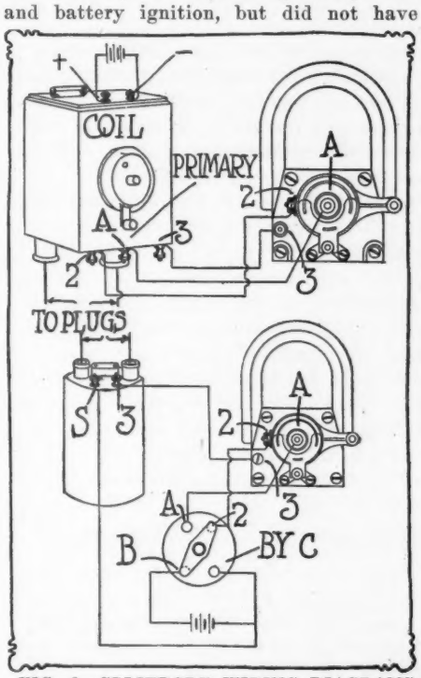


FIG. 2—SPLITDORF WIRING DIAGRAMS

very good success. I constructed a primary coil by winding two layers of No. 21 B. & S. cotton-covered copper wire on a soft iron wire core 5 inches long by 5/8 inch diameter. I used an ordinary vibrator, and connected a condenser across the vibrator points. The above coil was connected into the battery circuit. The ignition coils will throw a spark 1/2 inch long on six dry cells, but when my master vibrator was in motion the spark was only about 1/4 inch long. Kindly explain why I did not succeed.—J. N. H.

It is difficult to state just what the reason for your failure was. It might be due to poor adjustment of the trembler; perhaps the winding and core were not properly proportioned to the size of the condenser or vice versa. Possibly the insulation is not perfect; or some of the contacts poorly made. Motor Age does not attempt to redesign coils, because the subject is of too little general interest.

In Defense of Racing

Points Out Two Direct Benefits to Motor Car Manufacturers—Compliments the A. A. A.

DU BOIS, Pa.—Editor Motor Age—One never hears the manufacturers who were in racing in the early days and who are now resting on their laurels, condemning racing. They are considering their return at some time and if some of them would come now they would learn much about their product which has escaped them. Racing has accomplished a great deal for them and they recognize its value.

There are two direct benefits from racing, first bringing forth the weak points, secondly the advertisement derived from winning an event. Some will say, "We don't want a speed car, or we will never use all that speed." Why, of course not, but we like to know that the car we buy has been tried out in races and has proven its quality, also that we have an engine that is not lacking in power. For instance, the oiling systems of our cars never would be as far advanced as they are today if we had been without racing. What brings out the inadequate oiling system quicker than a race, or the weak steering knuckles? One factory had two out of three cars leave a race with broken steering knuckles. These incidents resulted in the steering knuckles being strengthened at once. What was it but racing which brought out the weaknesses in rear axles? Just glance at what happened to the French industry since it quit racing and how hard it is now fighting to get its races back. The same thing would occur here if we quit racing, but I hope we won't be like France, "only able to learn by experience."

Touring never has accomplished what racing has for the good of the industry. Touring developed larger and better brakes, but it lacks the support of the manufacturers, and is really only an advertiser. The last Glidden tour was only saved by private owners from the south with amateur drivers, and if this tour is to live it must be supported by private owners while the manufacturers get the advertisement free. Of course this tour does more for good roads than it gets credit for, but as for the good it will do for the betterment of car quality when the manufacturers do not enter, is hard to conceive.

A racing driver, who was suspended, has been trying through the newspapers and the Fairmount park race to damage the contest board of the A. A. A. by condemning races. This is purely spite work on his part and as soon as he is reinstated will enter as many races as possible. The A. A. A. should be highly complimented for their able handling and sanctioning of all racing events.—W. J. Marlin.

Cooling by Kerosene

Works in Some Engines, Harmful in Others—Tracing Currents of Splitdorf System

DETROIT, Mich.—Editor Motor Age—Will Motor Age, through the Readers' Clearing House columns, advise whether they have observed the action of kerosene as a cooling agent?

2—What is the maximum temperature at which it can be used?

3—Would it, if used at a temperature of 20 or 30 degrees Fehrenheit cause a bad odor or smoke to escape through the radiator vent?

4—Also kindly publish a diagram of the Splitdorf dual ignition system, similar to that of the Remy in the issue of January 4, 1912, and trace the circuits of both currents.—Kerosene.

1-2-3—While Motor Age has records of several cases in which kerosene has been used satisfactorily as a non-freezing cooling agent, its use for this purpose is not recommended, owing to the harmful results that have been obtained by some users. Still you might try it, but be careful not to allow the motor to overheat. It can be used advantageously at a temperature of 20 to 30 degrees Fahrenheit, in a cooling system adapted to its use; and even without a bad odor or smoke from the radiator, for except for the overheating it simply tends to disintegrate rubber connections.

4—A wiring diagram of the Splitdorf dual ignition system is shown in Fig. 3. A low-tension magneto is used; and the primary and secondary windings, the condenser and switch, indicated in the lower left-hand corner of the illustration, are not a part of the magneto. According to the positions of the various parts represented in this diagram, and assuming that the motor is in operation, the position of the switch shows that the magneto is supplying current. There is but a single winding on the armature of the magneto, indicating that it is of the low-tension type. The points of the circuit-breaker are separated, indicating that the primary circuit is broken and that a high-tension current is generated in the secondary winding of the induction coil, which at this moment is flowing through the high-tension lead to the revolving segment of the distributer on the magneto; and from the distributer to the spark plug in No. 1 cylinder, as shown by the position of the revolving metal segment.

When the switch is turned to the battery side and the motor is in operation, the current flows from the battery through the primary winding of the coil, then through the circuit-breaker on the magneto and back to the battery. When this primary circuit is broken by the circuit-breaker, the core of the coil is demagnetized, a high-tension current surges up in the secondary winding, then the distributer segment, making contact with one of the leads to a spark plug, permits the high-tension currents to complete their circuit across the points of the plug. The one end of the secondary winding is connected to the insulated electrode or central sparking point of the plug and the other end is grounded, as indicated by the dotted line. By being grounded, it is meant that the other end is attached to some portion of the engine having good metallic contact with the cylinders into which the spark plugs are secured. A spark plug has two electrodes between which the sparks occur, the insulated electrode, and the ground electrode; the latter generally being incorporated in the shell of the plug which screws into the engine cylinder.

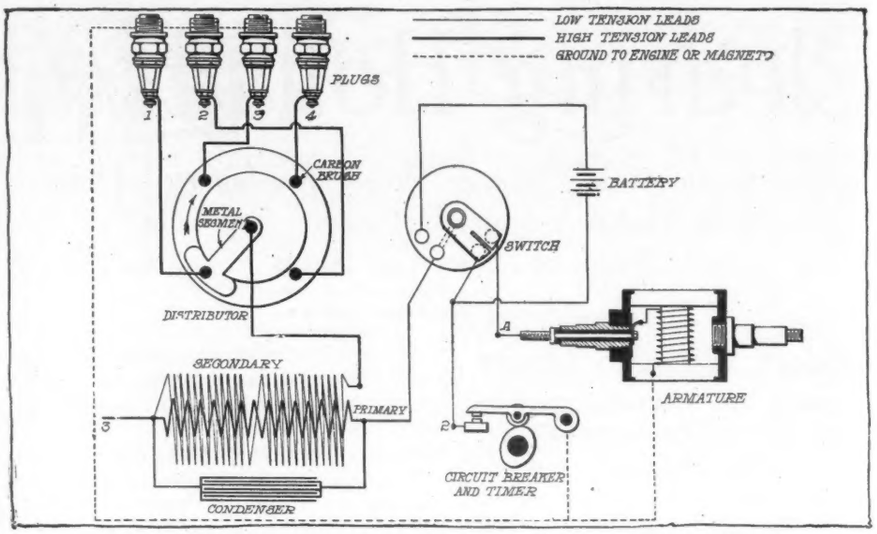


FIG. 3—WIRING DIAGRAM OF SPLITDORF DUAL IGNITION SYSTEM

SPLITDORF WIRING CONNECTIONS

Vienna, Ga.—Editor Motor Age—Will you kindly give me the wiring in detail of a Splitdorf non-vibrating coil, and the connections to the model H magneto as used on the two-cylinder AA Maxwell. The circuit-breaker has two connections, one on top with a small spring, and the other at the bottom of lever. What are the two connections for?—W. Turton.

The wiring of the two-cylinder low-tension Splitdorf magneto is, with one exception, similar to that of the four-cylinder magneto, a wiring diagram of which is illustrated in Fig. 3, in which the paths taken by the current can be traced. The one exception is that in the ignition system for two-cylinder motors, instead of having one end of the secondary winding of the coil grounded on the end of a primary wire, both ends are connected to the spark plugs, one end to the insulated electrode of one plug, and the other end to the insulated electrode of the other plug. This causes a spark to occur in both cylinders at the same time, but as the piston in one cylinder is just finishing its exhaust stroke while the other is on its firing center, the spark in the exhausting cylinder has nothing to ignite.

The external wiring connections between the magneto and a dash coil are shown in the upper diagram, Fig. 2; and those of a cylindrical coil, in the lower one. In the diagram with the dash coil, when the switch is turned to the magneto side, and the motor is in operation, the current flows from the end of the armature shaft A through a wire to the terminal A on the coil. The switch connects the terminal A with one end of the primary winding of the coil and with the terminal 2. An external wire is used to connect the terminal 2 of the coil with terminal 2 of the magneto. The wire leading from terminal 3 of the coil to terminal 3 of the magneto is a ground connection between the primary winding of the coil and the magneto.

The diagram, Fig. 3, shows the relative positions and connections of the various features of the ignition system when the magneto is supplying the ignition current. The spark is just occurring, as is indicated by the separated position of the circuit-breaker points, and in No. 1 cylinder as shown by the position of the revolving segment of the distributer. To trace the current, the points of the circuit-breaker have just separated, breaking the flow of current through the primary winding of the coil. This sudden break has induced a high-pressure or high-tension current in the secondary winding that has caused the current to jump across the gap of the spark plugs to which the current is distributed.

CALLS MODERN CAR CUMBERSOME

New Orleans, La.—Editor Motor Age—I submit the following for the motor car enthusiast and manufacturers.

The present day motor car is a big, cumbersome, complicated combination of machinery. It is almost a disgrace to American engineering enterprise. Why so much machinery? Why so many parts, intricate, puzzling, fragile and expensive? Why so much waste power, space and material?

What of the ultimate car, the car with a valveless, two-cycle, air-cooled gasoline motor, or cooled by refrigerant process, geared to a dynamo, generating electric power applied directly through storage batteries made 50 to 60 per cent lighter in weight by the Marino process of electric-plating, to a motor geared to the drive axle of each wheel, acting in unison and separately compensating? Power under control of a controller the same as on a street car, giving any speed; a steering apparatus geared directly to front wheels instead of through levers and connecting rods; the front of the frame goose-necked to permit turning in a small radius; no-rust wheel rims of tempered bronze with demounts of same material detachable by the turning of one nut or bolt; tires or casings with sides one-half to two-thirds of the way up of flexible steel shell bedded in rubber with a built-up tread of puncture-proof fabric or leather, with tube as at present, or cylindrical casings with metal base combining demountable principle, with flexible steel shell sides and puncture-proof tread with tubes in proper lengths; blind ends made to telescope, with valve properly placed, threaded through; a button control on the keyboard located on the steering wheel for power, horn, brakes, carbureter and lights; a carbureter agitated and accelerated by electricity, simply and absolutely; a body of sheet bronze panels, or any other durable non-rusting metal or material, of pleasing, permanent color, doing away with all painting and its unsightly appearance after a few months' use; the body so constructed that it will swing between the axles, giving easiest riding qualities; springs built up of ball-and-socket joints or conections and be responsive and counteracting for all road inequalities and side and end sways; not over 120-inch wheel base, and all weighing not over 2,000 pounds, and costing not over $1,000 with every accessory required for a complete, comfortable, convenient car.

Consider that you eliminate radiator, fan, pump, magneto, clutch and levers, universal joints, transmission gears and levers, shafts, connecting rods, rockers, etc.

" 'T is a consummation devoutly to be wished."

Make haste, engineers and inventors, and give us this car. It is possible, it is feasible.—Charles Roth.

THE NICOLA TESLA ENGINE

Callender, Ia.—Editor Motor Age—Through the Readers' Clearing House will Motor Age give a description of the Nicola Tesla engine showing the inlet and outlet ports?—C. J. Fox.

The two sectional views of the Tesla rotary engine in Fig. 4 illustrate the construction. This is not an internal combustion engine, but the energy of the burned gases are used just as steam is used in a turbine. In fact, the motor illustrated is used as a steam turbine with gasoline. The combustion takes place in a separate chamber. Thus Fig. 4 shows a Tesla rotary engine, applicable for gas, steam, or hot-air drive, having a nozzle through which the pressure of the driving steam is increased. A reversing nozzle is also provided.

The rotater is composed of disks D, having central openings O and spokes S. The disks are held in position, being keyed to shaft S1, which is mounted on suitable bearings. Washers conforming in shape to the spokes and riveted thereto, separate the disks. The runner is mounted in a casing having two end casings, with outlets E, stuffing boxes and a central ring R1 bored out to a circle of diameter slightly in increase of that of the disks. The ring has flanged extensions with inlets into which nozzles N are inserted. Circular grooves G and labyrinth packings are provided on the sides of the runner. Despite the difficulty attending the work of determining the operating conditions in this machine, the following seems to be an established fact. The torque produced by the engine is directly proportional to the square of the velocity of the fluid relatively to the runner and to the effective area of the disks, and inversely to the distance between the individual disks. The maximum amount of work is done when speed of runner is one-half that of fluid.

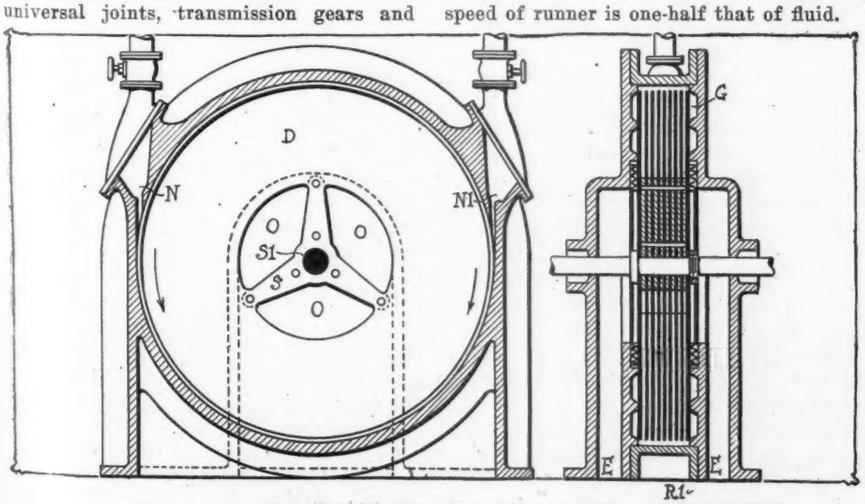


FIG. 4—SHOWING FEATURES OF TESLA MOTOR CONSTRUCTION

Platinum Points Wear

Operator Forgets to Switch From Batteries to Magneto After Motor Is Started

DENVER, Colo.—Editor Motor Age—Through the Readers' Clearing House will Motor Age answer the following questions?

1—I have the care of several two-cylinder trucks equipped with Splitdorf model G magnetos. The platinum points on the breaker-bars need replacing about every 30 days. I am particular to keep the gaps at the proper distance and otherwise look after them as per instructions in the catalog.

2—What should be the life of the platinum points?

3—Is there any way of wiring this magneto so that any of the ordinary battery magneto switches could be used? It is equipped with a special switch not obtainable in this city. The switches that came with the trucks need replacing and I don't want to send away for them if I can help it.

4—Could you explain the function of the extra break on this magneto? The following sketch, Fig. 1, will make my question clear, I hope.

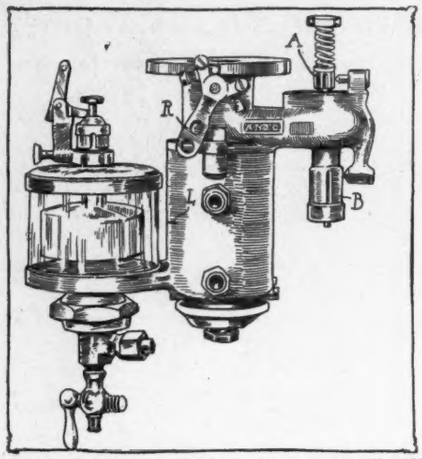
5—What is the proper way to set this and how much gap should it have?—R. A. Egerer.

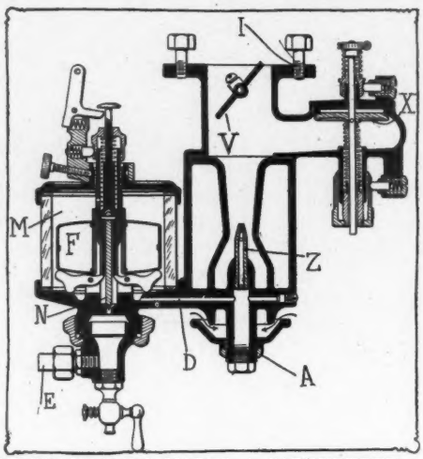
1—There are a great many Splitdorf magnetos of the same type as yours which do not require renewal of the platinum points once in a year; so it is evident that your trouble is caused either by too much oil on the circuit-breaker mechanism, improper setting of the points or the excessive use or too much battery current. The latter is the most likely cause. Perhaps the drivers of the trucks very often neglect to switch from the battery to the magneto upon starting the engine. This is an evil practice, and the most common destroyer of platinum points. The switch always should be turned to the magneto side immediately the motor is started.

Since you state that you are careful to keep the gap between the platinum points properly adjusted, this then is not likely to be giving you trouble; it might be well to state for the benefit of others, however, that this space should be about $\frac{1}{32}$ inch; and that the Splitdorf company now furnishes a small wrench, W, Fig. 1, with a gauge G attached, which greatly facilitates adjustment of these points.

2—Under favorable conditions the life of a pair of points should be over 10,000 miles.

3—Yes; but Motor Age would advise that you take up the switch matter with the Splitdorf agency, Chicago, and have it send you a couple of the new improved steel switches that the company recently has brought out. Other switches might be used, but they are hardly to be recom-





FIGS. 5 AND 6—DESIGN AND ADJUSTMENT OF STROM BERG MODEL A CARBURETER

mended over the new switches above mentioned, and to attempt to use them might give rise to more trouble than the experiment is worth.

4—The extra pair of contact points T, Fig. 1, between the upper edge of the circuit-breaker lever L and the blade spring G above it, are not electrical contact points, but merely provided to make a suitable contact between the end of the blade spring and the circuit-breaker lever. The blade spring is simply a buffer or shock absorber, which accelerates the return of the contact lever when struck by the cam at high speeds.

5—There should be about 1/64 inch space between the contacts T of the blade spring and the top of the circuit-breaker; and about $\frac{1}{32}$ inch is the proper space between the platinum contact points P, one at the end of the lever and the one on the end of the adjustable screw S.

QUESTIONS ABOUT E-M-F

Orchard, Park, N. M.—Editor Motor Age—I would like to ask the following questions:

1—Where can I obtain cloth seat covers?

2—Give diagram of 1911 model E-M-F 30 transmission; also tell how to reassemble and set same.

3—How can I stop the rattling in brake bands on the same car?

4—Give directions for overhauling rear wheels, axle, differential and transmission; also how to test for wear on E-M-F 30.—A Reader.

1—You should be able to obtain cloth seat covers for a 1911 model E-M-F 30 from the nearest E-M-F agent, from the E-M-F factory, Detroit, Mich., or from the Studebaker E-M-F agency Chicago. If the car for which you desire the seat covers is not an E-M-F, you might get them either from the manufacturer, or from any large carriage maker, trimmer or repairer like the Chicago Coach and Carriage Co., or C. P. Kimball Co., Chicago; it is very probable that you could find concerns of this kind closer to home.

2—As regards the transmission gear, it generally requires but little attention beyond cleaning it thoroughly, looking after the alignment of the shafts and making sure that the gear-shifting lever and its connections are so adjusted as to permit the gears to mesh properly.

Assuming that your gearset is dis-assembled, inspection should be very easy. See that all worn parts are replaced with new ones and have them carefully fitted. The assembly is shown complete in Fig. 7. There should be no lost motion in the shaft bearings, in none of the bearings in fact, and still when the assembly is complete, all parts should run freely without binding at any point. There is but one adjustable bearing in the E-M-F 30 combined transmission and rear-axle; this is the Timken roller bearing just in front of the bevel driving pinion. This bearing is contained in an adjustable cage by means of which the pinion may be brought into proper relation with the larger gear.

If the pinion is too far away from the bevel gear there will be much lost motion between the teeth and noisy operation will result, and if too close, a whirring noise will be heard when the car is in operation; the noise will resemble that which occurs when there is not sufficient grease or oil in the case. If the gears are badly worn it will be impossible to adjust them properly, in which case new gears should be fitted. If the bearings on either side of the large bevel gear and differential mechanism should be worn, that, too, would make it difficult to properly adjust the gears. Adjustment of these mechanisms generally requires the attention of a good mechanic and should not be attempted by others.

3—The rattling of your brake bands and rods most probably is due to loose and worn pins and eyes. These are working parts that are less often cleaned and lubricated, and therefore subject to excessive wear. The remedy is to fit new pins, make them fit snugly so that they will work freely without lost motion, then keep them lubricated.

4—An overhauling consists simply in cleaning the mechanism thoroughly, replacing all worn parts, and then adjusting them properly.

To Facilitate Starting

Several Suggestions from Minnesotan on Methods of Warming Inlet Pipe of Motor

SAUK CENTRE, Minn.—Editor Motor Age—Some time ago I was reading in a motor journal an article in which the writer took the position that gas would not ignite more readily hot than cold. While this may be true I think that no gasoline motor can be started as easily cold as if the gas was heated, for I have had experience up here in Minnesota where it gets very cold at times. This experience is that a hot intake pipe will start a cold motor perfectly when it is utterly impossible to start when the motor and intake are cold. I tried out this proposition very carefully and found I easily could start the four-cylinder motor on one turn of the crank after the intake had been heated with a gasoline blow-pipe, whereas any amount of cranking would not start it.

Perhaps the writer had reference to gas only, but if so he certainly did express himself so as to be understood in the literal sense as should be the case. I have no way of testing gas in a gas main, cold or hot, but my reasoning tells me that gas will explode quicker heated than it will cold, for clear reasons.

I tried out by pumping into the cylinders cold gas. Igniting it I found that it burned slowly, whereas after running the motor a considerable length of time, until the intake was quite hot, I found on pumping gas into the cylinders and igniting it, it would explode with a sudden flash, with a yellowish looking flame.

Various devices have been invented from time to time with this end in view, and with great success and practicability for the users. I recall once trying to start a cold motor, and all the expert mechanical coaxings were a flat failure by the methods in common use, but as soon as I took a gasoline blow-pipe and first filling the air intake with waste, so the gasoline in the carbureter would not take fire, I turned a hot blast of the torch on to the intake pipe until it got smoking hot, and then had the pleasure of starting the motor on one turn of the crank.

As a matter of fact, one must be very careful with a blow-pipe when around the car, for where gasoline is allowed to come in contact with air a gas begins to form immediately. Of course, this gas is highly inflammable and permeating the surrounding atmosphere would take fire and burn very fiercely, doing a vast amount of damage, but by exercising a little care no trouble need be had.

Another good way to start when cold is the cause is to take hot water and either wrap rags around the pipe and pour the boiling water on them, or pour directly on the pipe, but care must be taken that no water gets into the motor's carbureter.—A. D. Carpenter.

Starting on Magneto

If Motor Is *in* Good Condition, Advance the Spark Lever and Crank Motor Briskly

DIXIE, Wash.—Editor Motor Age—Will Motor Age please answer the following questions through the Readers' Clearing House?

1—I have a model 63 Rambler. There are several other cars here of the same model and they all start very easily on the magneto except mine; they are equipped with the Splitdorf magneto and Reliance closed-end spark plugs. My car starts very easily on batteries but will not start on the magneto. The magneto works well after it is once started. What is the reason it will not start as the others do?

2—Why can't I use the storage battery for ignition? Is a 6-80 battery too strong for the magneto or its distributor? Please explain.

3—Why is it necessary to re-time the valves after they are ground, if the camshaft is not moved? I should think that adjusting the valve-stem so there would be the proper distance between it and the pushrod would be all that is necessary.

4—My car is equipped with a Stromberg carbureter. To what part of it does the throttle connect? Is it giving too rich a mixture and how can I regulate it? It shoots back into the carbureter when the engine is cold.

5—Please explain the process of carburation, using a Stromberg.

6—I understand why a clutch brake helps in changing gears from low to intermediate and from there to high, but it seems to me that the clutch should spin faster when shifting back from high. Please explain.—Paul Thonney, Jr.

1—Your motor does not start as readily as other similar ones, perhaps because either it is not in as good condition as the others, or you neglect to advance the spark when trying to start on the magneto. To start a car on the magneto it is necessary to advance the spark lever about three-quarters the length of its travel; then pull the starting crank over the compression center as sharply as possible. Be careful in starting with the spark advanced and crank the motor in a way that will not injure you in case of a back kick.

If you will see that the circuit-breaker points of your magneto are clean and properly adjusted, and that the compression is good and equally good in all cylinders, and that the points of the spark plugs are not too far apart, it is quite likely that you will be able to start your motor just as readily as the others. About $\frac{1}{32}$ inch is the proper space to have between the points of the plugs, and the same applies to the space between the contact points of the circuit-breaker when full open. If these suggestions do not give the desired results, send the magneto to Splitdorf agency at San Francisco, Cal., perhaps the magneto could be recharged to some advantage.

2—There is no reason why the storage battery should not give just as satisfactory service as the dry cells. Your trouble may be due to negligence in switching from the battery to the magneto immediately after the motor is started. The

3—It should not be necessary to retime the valves after grinding them in; to adjust the pushrods so that there is between 1/64 and $\frac{1}{32}$ inch space between the end of the stem and tappet is sufficient.

4—The carbureter regularly fitted to the Rambler car is a Stromberg model A, and the throttle control rod is connected to the throttle lever R, Fig. 5. If the popping or shooting back in the carbureter takes place only for a few minutes while the motor is cold, but runs well when the motor gets warm, it might be advisable to leave the adjustments alone. The popping might be stopped, however, by simply turning up the adjusting nuts A and B, about two notches each.

Popping in the carbureter generally indicates a lean rather than too rich a mixture, and by tightening up the auxiliary air valve springs, by means of the nuts A and B, the mixture is enriched. Too rich a mixture is indicated by a strong pungent odor of the exhaust gases, when the motor is firing regularly without misfiring. If one smells of the exhaust gases while the motor is missing, even too lean a mixture will have a strong odor, so see that this test is made when motor is firing regularly.

5—A sectional drawing of the Stromberg model A carbureter is shown at the right in Fig. 6. This will serve to show the process of carburation. The liquid fuel enters at E and flows up into the float-chamber M. As this chamber fills with fuel, the float F rises and allows the needle valve N to descend and close the opening into the float chamber; thereby automatically stopping the flow of fuel. There is a duct D communicating between the float chamber and the spray-nozzle Z, and the float is so regulated that it keeps the fuel in the spray nozzle at a required height. This height is indicated by a line L on the outside of the carbureter. The level of the fuel in the float chamber should be even with this line.

The carbureter is attached to the intake pipe of the motor at I, and the suction of the air through the carbureter when the motor is in operation, draws fuel out of the spraying nozzle in the form of spray. This spray is mixed with the air as it passes through the carbureter and on into the cylinders; and thus it forms the gaseous fuel mixture. The main air inlet is at the A, directly below the spraying nozzle N, and the air enters and passes the nozzle as indicated by the arrows. The amount of fuel mixture admitted to the intake pipe and cylinders of the motor, is regulated by the valve V, which is operated by the throttle lever on the steering column.

Inasmuch as considerable more air than fuel is required to form the gaseous mixture necessary, an auxiliary air valve X is provided. This is controlled by adjustable springs, which when the suction becomes sufficiently great, permits the valve to open and admit more air into the mixture.

6—You are right in believing that the clutch should spin faster in shifting from a higher to a lower speed gear, and the clutch brake should be so adjusted that it is not brought into use unless desired. This is easily done by arranging the brake adjustment, so that by pushing out the clutch pedal just sufficiently to let the clutch run free, it will keep on spinning; while to bring the brake into operation and stop the spinning, only a little further depression of the clutch pedal will be necessary on the part of the driver.

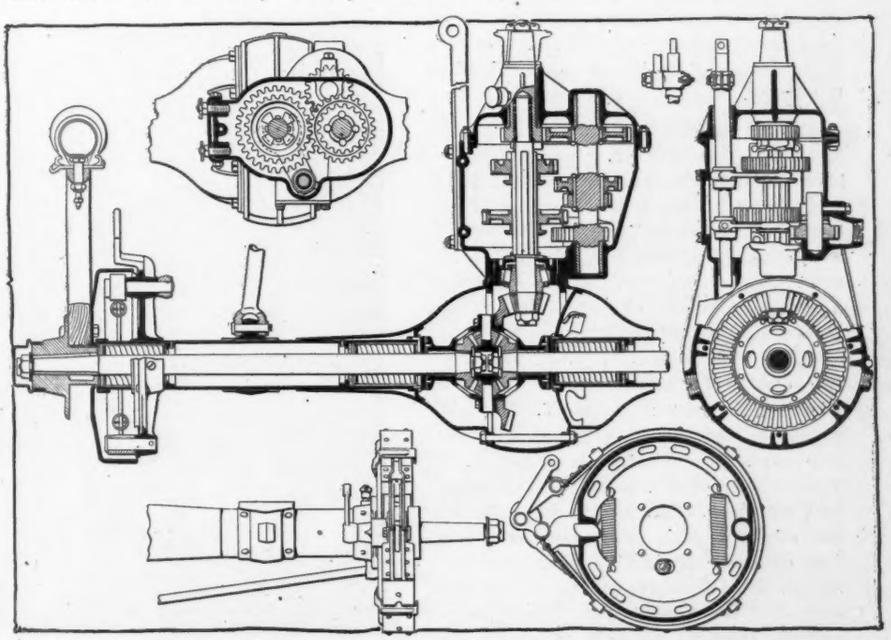


FIG. 7—SHOWING FEATURES OF E-M-F TRANSMISSION MECHANISM

From the Four Winds

WOMAN Chosen President—The Concord Automobile Club of Concord, N. H., at a meeting last week elected Miss Esther J. Reynolds, president and Miss Mildred Hodgman, secretary and treasurer.

Iowa Collecting Taxes—The sum of $67,000 was turned over to the treasurer of state of Iowa, by the secretary of state, as the result of collections of motor license fees during January. There are still 10,000 owners in the state who have not yet taken out their licenses for the new year.

Clubs Join Hands—The Fremont Automobile Club of Fremont, Neb., is co-operating with the South Dakota State Automobile Club in an attempt to put through a new road between Fremont and Sioux City, Ia. The proposed road will parallel the Burlington track. Much attention has been paid to developing the roads east and west in Nebraska, but little has been done on the roads running north and south.

New South Dakota Road—At the good roads convention at Deadwood, S. D., State Engineer Samuel H. Lee of Pierre, outlined a road across the state which will be 280 miles in length, from the Minnesota line to the northern hills. The road follows the old Deadwood trail from Fort Pierre west and from Rapid City through Sturgis, Deadwood and Lead. It will cross ten counties. It will be built by local effort and co-operation, and will cost, in the main, from $300 to $400 per mile. The officers of the interstate association elected before adjournment were: President, A. L. Kinkead, Huron; vice-president, Hayden M. White, Buffalo, Wyo.; secretary-treasurer, I. A. Herrick, Deadwood.

Badgers Elect Officers—William H. Raymond of Milwaukee, was elected president of the Wisconsin State Automobile Association at the annual meeting of the board of directors in Milwaukee last week. A. P. Cheeck of Baraboo is the new vice-president; Dr. A. E. Rector of Appleton, second vice-president, and James T. Drought was re-elected secretary, as was George A. West, treasurer. The executive committee is: M. C. Moore, Milwaukee; James T. Drought, Wisconsin member of the A. A. A. executive committee; George A. West, A. F. Winter, Sheboygan, and W. D. James, Fort Atkinson. Mr. Moore was president for 3 years and now takes the position of state organizer. The executive committee will have charge of arrangements for the third annual Wisconsin reliability tour, to be held in July. The association has a membership of 1,600, which is so small a proportion of the 25,000 motorists of Wisconsin that an organization campaign will be started at once.

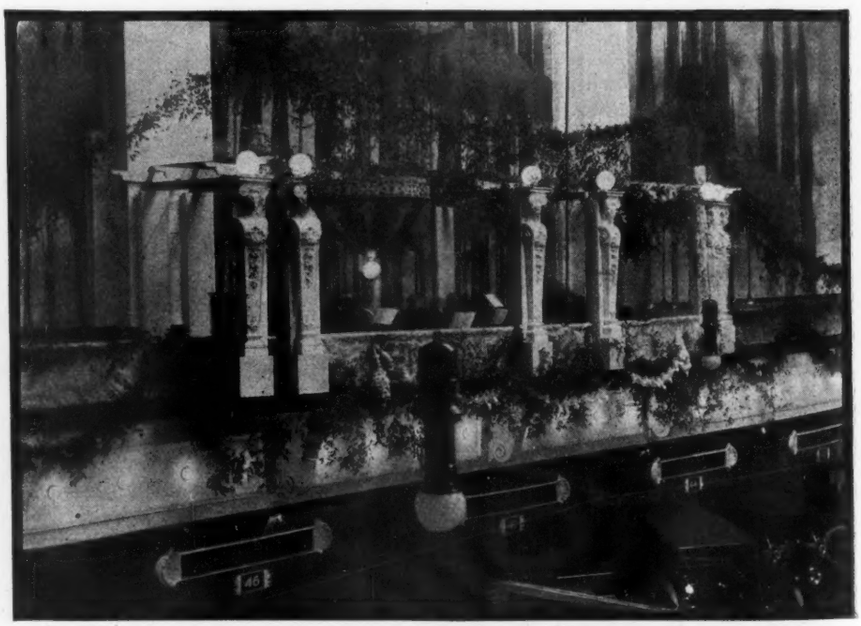
Maryland Appointment—One of the finest appointments made by Governor Goldsborough of Maryland, was that of O. E. Weller, of Arlington, Baltimore county, as state chairman of the state good roads commission. Mr. Weller will succeed John M. Tucker, who has tendered his resignation to take place March 1.

Chauffeurs' Bradstreet's—The Chauffeurs' Reference Agency has been formed in Minneapolis to serve as a Bradstreet's for owners who wish to get the record of prospective employes. The company is expected to serve owners and drivers alike. President N. C. Hickcox says: "Next year a bill is to be introduced into the legislature to classify chauffeurs into grades."

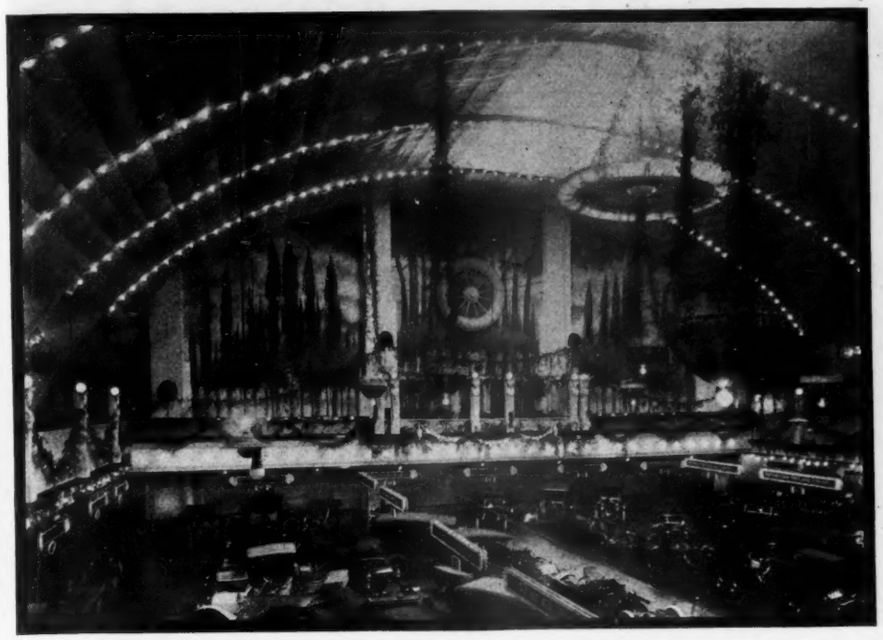
New York Dealers Elect—The annual meeting and dinner of the Automobile Dealers' Association of New York, was held February 14. President John F. Plummer reviewed the work of the association in 1911, and told of what had been done to secure the present branch office of the secretary of state for the city and of the various changes that have been made in the existing law, particularly as to the division of the year so that purchasers of cars after August 1 do not have to pay full fees for registration. The following were selected as the new board of directors: M. J. Budlong, R. D. Garden, John F. Plummer, C. P. Skinner, F. Eveland, H. M. Bronner, C. M. Brown, W. S. M. Meade, Arthur M. Day and A. L. Newton. Officers for 1912 will be elected in March.

Hotel Men Promoting Touring—The Empire Tours Association has been incorporated in Albany, N. Y., Proctor C. Welch, manager of the Onondaga Hotel, Syracuse, being secretary. The organization consists of 125 hotel men in the state banded to promote motor touring. The headquarters will be at the Onondaga and work will be done for the improvement of highways, the selection of the best touring routes and the direction of interest toward spots notable for scenic and historical attributes. W. E. Leffingwell of Watkins Glen, is president. F. W. Rockwell of Albany, is vice-president and Mortimer W. Kelly of Bluff Point, Lake Ontario, is treasurer.

Texas' Road Census—It is shown by statistics that have just been gathered that there are approximately 140,000 miles of highways in Texas and of this mileage 37,500 are improved. There are about 6,500 miles of modern macadamized roads in the state. The bond issues for good roads in Texas during the calendar year 1911 aggregated $8,915,500, and the amount of funds unexpended from the preceding year and which was available for good road construction last year was $2,589,456. This gave a total of $11,504,456 that was available for good road construction during 1911. The total amount of bonds voted for good roads in Texas in 1911, was more than double that issued for the same purpose the preceding year.



MUSIC STAND AND DECORATIONS, ARMORY SHOW, MINNEAPOLIS



GENERAL VIEW OF ARMORY SHOW AT MINNEAPOLIS

The largest issue in 1911 of any county was that of Tarrant, which was $1,600,000. Bowie and Dallas counties each issued $500,000 of bonds for good roads.

New Denver Club Official—Frank E. Thomas has been appointed assistant secretary of the Denver Motor Club, and this week took his place at the club's office in its new quarters in the Majestic building.

All Must be Licensed—Highway commissioner E. M. Bigelow of Pennsylvania, has issued orders that the provisions of the motor license act, requiring persons operating motor vehicles to be licensed would be enforced. This will mean that all persons who operate trucks or cars, even if they perform such duty only part of a day or as a part of their regular work must be licensed.

New Club at Kenosha—The Kenosha Automobile Club of Kenosha, Wis., was organized at Kenosha, Wis., on February 16, with an initial charter membership of fifty-four and 100 more in prospect before the charter closes. The club will incorporate at once. The Milwaukee Automobile Club is responsible for the organization and is now working to secure clubs in Racine and other lake shore cities in order to promote good road work and encourage co-operation among motorists.

New Road Body—Stating its object is to promote the establishment, building and maintenance of national and other highways throughout the United States, the National Highways Association has filed articles of incorporation with the recorder of deeds. A board of three trustees will manage the affairs of the corporation for the first year. The incorporators are: Colonel T. Coleman du-Pont, who is building a boulevard across the state of Delaware; W. S. Duvall, former president of the Automobile Club of Washington; C. H. Claudy and Edmund S. Wolfe, of Washington, and Charles Henry Davis, of South Yarmouth, Mass.

Signboards for New York State—One hundred and fifty-five road signs will be erected through Jefferson county, New York, as soon as weather permits by the Watertown Automobile Club, which will work south to Pulaski, connecting with work done northward to that point by the Syracuse club. The northern club will erect signs north to Gouverneur and cover the north country. Danger signs will be placed on bad hills and curves. It is planned to thoroughly cover all highways leading to the Thousand Islands.

Minnesota's Great Showing—Secretary of State Julius Schmahl, who has charge of the motor registration in Minnesota, said at the opening of the Dealers' show in the Auditorium: "Minnesota is regarded as better than an average motoring state. The energy of hustling agents and the demand of the people within its borders, is best shown by the statistics from records in the motoring registration department. The year 1909 closed with a registration of approximately 7,000 cars for the state. In 1910 this figure was increased to exactly 12,000, exclusive of machines owned by dealers, while last year nearly 20,000 cars owned by individuals were licensed. It can safely be predicted that before 1912 closes there will be nearly if not more than 30,000 cars doing service in Minnesota. The average value of the motor cars in the state can be placed at $1,000, consequently the valuation of cars in the state has grown from $7,000,000 to $12,000,000, from $12,000,000 to $20,000,000 and from $20,000,000 to $30,000,000, exclusive of the amount expended for repairs, gasoline, drivers and garages, the sum total being nearly $50,000,000. Hennepin county is the great motor county of the state. Last year one-fifth of the cars owned in Minnesota were owned by residents within its borders."

Jericho Horn Not Law Infraction—Rulings made by Massachusetts judges hold, that the Jericho horn, which is of the exhaust type, does not come within the meaning of the Bay State law which prohibits the use of a horn that makes a harsh, unreasonable or objectionable noise.

Jail Sentence for Chauffeur—For the first time since the passage of the Maryland law, a court sentence has been imposed for a motor car running into and killing a man. Earl Bowman, the chauffeur, was sentenced by Judge Gorter of Baltimore, to a year in jail on the charge of running into and killing George Gordon, an aged watchman. The state charged that Bowman not only ran into and killed Gordon but that he and other young men in the motor car drove off after the accident without stopping to care for the injured man.

Harrisburg Club Election—Proposed traffic regulations and improvements to the highways leading into Harrisburg, Pa., were the chief topics discussed at the annual meeting of the Motor Club of Harrisburg. A campaign to secure every motor car owner in Harrisburg and vicinity as a member of the club also was started. The officers elected were: Robert McCormick, president; F. H. Bomgardner, first vice-president; Herman F. Hahn, second vice-president; E. K. Frazer, third vice-president; J. Clyde Myton, secretary and treasurer.

Against Dazzling Headlights—The ordinance committee of the Detroit common council has instructed the corporation counsel to draw up an ordinance, patterned somewhat after the New York ordinance, regulating the use of glaring headlights on motor cars. The ordinance will contain a provision that exceedingly bright lights shall be so tilted that they will not cast their rays more than 300 feet ahead of the car. Alderman Allan, chairman of the committee, will try to have incorporated in the ordinance a provision requiring tail lights on all vehicles except trucks.

Tour Responsible for Bridge—That motor tours have their uses in awakening people to the need of improved roads and bridges has just been demonstrated by the formation of a company to build a bridge over the Altamaha river in Georgia. This will be the first bridge to span the river that cuts South Georgia in two. The need for this bridge was forcibly demonstrated in the two tours around Georgia, and the men who subscribed most of the money to build the bridge were men interested in the two events. The bridge will be completed in time for use on the next tour around Georgia.

More Than Forty Makers Equip Their

Automatic Devices Are Provided to Limit Speed of Motors and Cars and So Prevent Abuse

IN order to limit the speed of motors and cars, and thereby reduce the possibilities of abuse and excessive wear and tear on the mechanisms, many of the commercial vehicle makers now-a-days are fitting automatic speed governors to their products in addition to the means provided for controlling the speed and power of the motors by hand.

The governor is particularly useful for preventing racing of the engine at such times as, owing to the exigencies of traffic, or otherwise, the driver declutches or disconnects the motor from the driving gear. If no governor be fitted and the clutch suddenly is thrown out, the motor often will run at a terrifically high rate of speed until the operator gets an opportunity of removing one hand from the steering wheel to retard the throttle. Oftentimes this cannot be done until the motor has raced for several seconds. Racing of this nature is very detrimental to the mechanism of the motor because of the excessive vibration and consequent tendencies towards crystallization that accompany the practice. It often happens that a driver of a motor truck will intentionally race his motor for the purpose of cleaning a spark plug, or to learn if it is firing regularly, or for no particular reason at all except that perhaps he thinks that it might shake the carbon out of the cylinders, or rattle poorly adjusted parts back into adjustment.

By limiting the speed of the motor it also is possible to limit the speed of the vehicle, and this is one of the chief values of the speed governor as it is now applied to commercial vehicle motors. Many truck drivers heretofore, when the day's work was done, or nearly done, have gotten into the habit of tarrying by the roadside generally for refreshments or the like; or, having been forced to make unusually late deliveries, or work longer than usually required, they have driven the motors back to the garages at the end of the day's work at a high rate of speed without load, rattling the vehicle over rough roads and bumps in a most unscrupulous and destructive manner. To reduce the possibilities of this abuse has been one of the chief reasons for the application of the automatic speed governor to the commercial motor car. There are in use at the present time on the commercial vehicle two types of automatic speed governors, the centrifugal type and the hydraulic type. The centrifugal type of governor is almost universally used; there having been but one car at the Chicago commercial vehicle show that was equipped with a hydraulic type of governor. This type was seen on the Autocar.

The centrifugal type of governor generally takes its action from two balls or weights W linked to one of the revolving spindles or shafts of the motor, and also linked to a collar or sleeve C sliding on the same spindle. The weights normally are held close in to the spindle by springs S, but as the speed of rotation increases the weights fly outward more or less, and in so doing move the collar lengthwise. The collar generally is connected to the throttle of the carbureter, so that as a certain speed is approached the governor begins to close the throttle valve and cut down the supply of gas; thus as the speed falls the tendency to close the carbureter valve ceases and remains at the maximum limit of governor control.

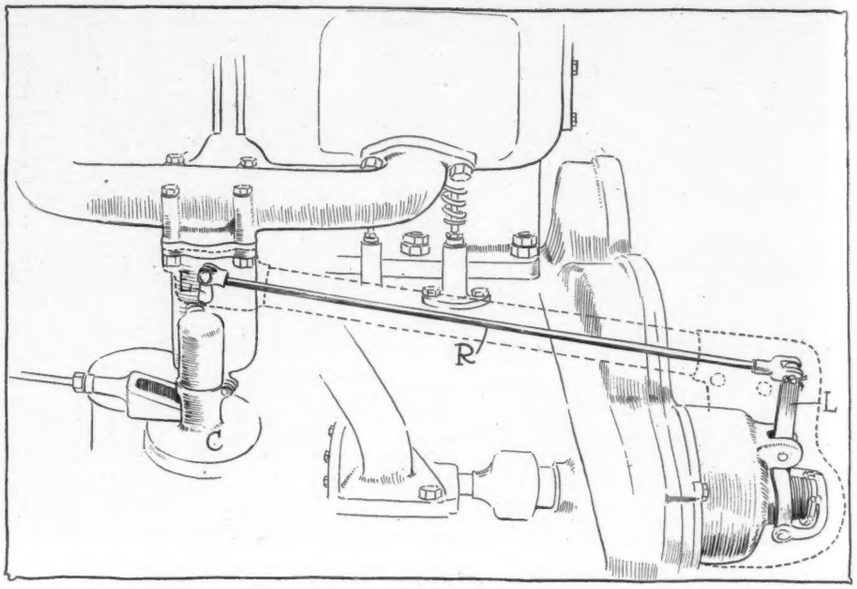
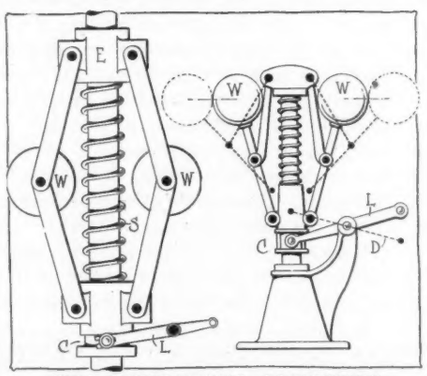


FIG. 1—SHOWING ARRANGEMENT OF GOVERNOR ON NEW PACKARD TRUCK

Governor is incased and acts on lever L, which communicates with throttle valve lever E of carbureter by means of rod R. The dotted outline represents the casing which incloses these levers and rods to protect them from dirt and meddlesome drivers.

By George W. Gaidzik



TWO CENTRIFUGAL GOVERNORS

The upper ends E are secured to shaft, balls or weights W revolve and move outward, lifting collar C against spring G. Lever L is yoked to collar C. Movements indicated by dotted lines

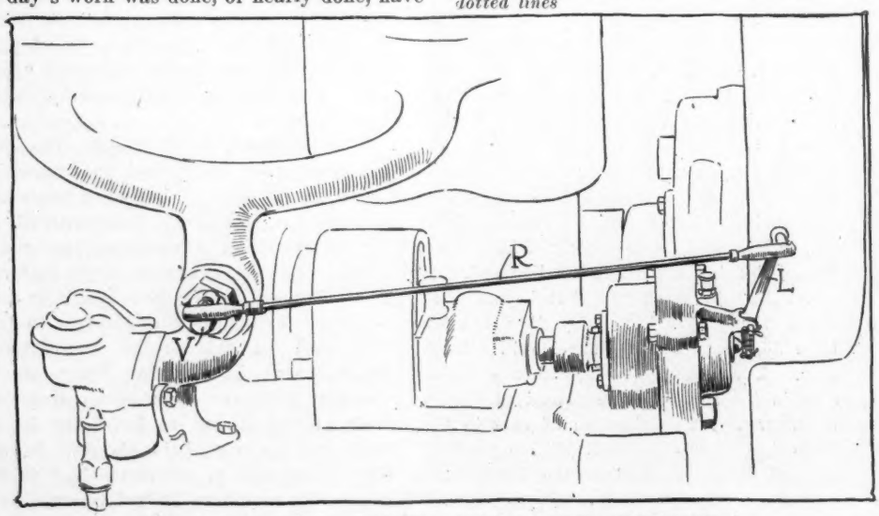


FIG. 2—THE KELLY TRUCK'S MOTOR SPEED GOVERNOR

Trucks With Speed Governors for 1912

Practically All Mechanisms Employed Are of the Centrifugal Type and Act on Engine Throttle

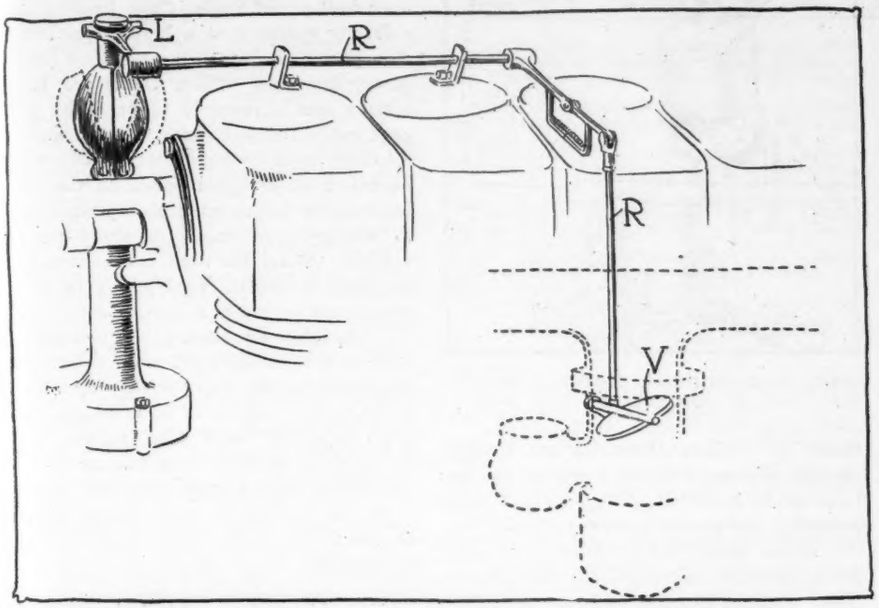


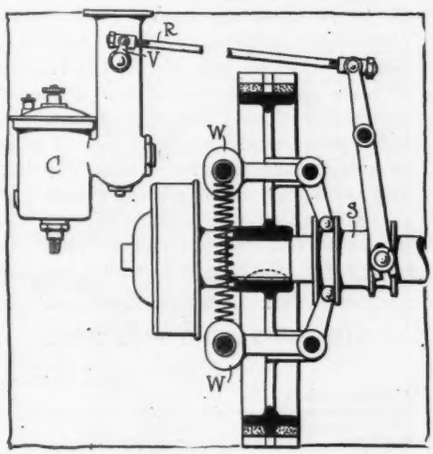
FIG. 3—EXPOSED GOVERNOR USED ON THE AVERY TRACTOR TRUCK

In operation, as the governor or the vertical shaft revolves, the weights swing outward as indicated by the dotted outlines. A cam formation at the bottoms of the weights actuates a sleeve on the shaft which communicates through yoke L, rods R, with the carbureter valve V

The governor may be adjusted to operate at higher or lower speeds by altering the tension of the springs, or by other means. For instance, it is possible to change the limits of speed by shortening or lengthening the rod communicating between the governor and the throttle valve of the carbureter either causing it to increase or decrease the throttle opening. Some makers also have provided a means whereby the governor is also controllable by an accelerator pedal, the depression of which temporarily puts the governor out of action and allows the motor to run at its highest speed so as to develop its full power. Most makers, however, have set the limits of the speed governor at the point where the motor develops its maximum efficiency.

The hydraulic type of governor as used on the Autocar comprises a flexible diaphram placed near the carbureter, having a rod communicating between it and the throttle valve of the carbureter. This diaphragm is acted upon by the pressure of water in the cooling system; and as this water pressure or flow in the cooling system is automatically increased or decreased by the speed of the water pump as the motor speed is varied, adjustments are provided and set so that the throttle of the carbureter may be governed in this manner.

Motors which are specially designed for commercial car service, generally are slow-speed motors designed to give their maximum efficiency at comparatively low speeds. The Alco 7000-pound truck motor, for instance, is designed to operate at 850 revolutions per minute, while propelling the vehicle at its normal high speed of 12 miles per hour. The Packard truck motor is designed to operate at about 1,000 revolutions per minute, while driving the 3-ton truck 12 miles per hour, and the 2-ton truck at 14 miles per hour. Although the Mack motor is a slow-speed motor designed to run at about 850 revolutions per minute, its vehicle speeds may be varied considerably according to the service to which the truck is subject. The Locomobile 5-ton truck also has a low-speed motor, which develops its maximum efficiency at about 900 revolutions per minute and propels the vehicle at about 10 miles an hour.



CENTRIFUGAL GOVERNOR APPLIED

In the accompanying illustration several styles of governors are shown as seen on trucks at the Chicago commercial vehicle show. In Fig. 1, of the Packard 2-ton truck, the governor is of the centrifugal type located at the right front end of the motor in front of the engine gearcase and operated off the forward end of the magneto gearshaft. It is thoroughly incased and only the control rods and levers are visible; and in the latest models even the control levers are inclosed in tubes as indicated by the dotted outline. The action of the governor inside of the case, moves the lever L; this movement is communicated through the rod R, to lever E; which is connected with the throttle valve located just above the carbureter C.

The practice of entirely inclosing the control rods and all parts of the automatic governing mechanisms is growing in popularity, and the object is twofold. In the first place, by inclosing them they are

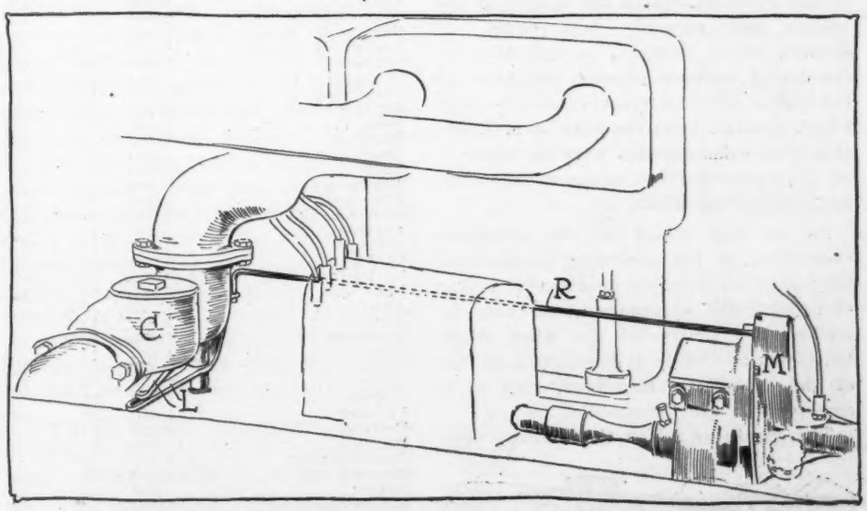


FIG. 4—SHOWING GOVERNING DEVICE ON MACK MOTOR TRUCK

protected from injury, dust and dirt, which should facilitate their operation and prolong their life and adjustment; in the second place, they are not so easily tampered with by the unscrupulous or dishonest driver. In this latter respect, some makers have even gone so far as to provide seals on the governor housings to prevent their being unauthentically opened.

Another somewhat similar arrangement of the centrifugal type of governor is to be seen on the Kelly car. This is illustrated in Fig. 2. As in the two mechanisms previously described, the governor is incorporated in the engine-gear housing at the right front end of the motor, and the entire mechanism except for the control rods and levers are thoroughly encased and lubricated by the same generous oil supply that is fed to the engine gears. In this type the lever L communicates with the carbureter valve V by means of the rod R.

The governor of the Mack truck is somewhat similar, as is shown in Fig. 4. The governing mechanism M is encased and operated off the engine gears at the right front end of the motor, and a single rod R communicates between it and levers L, that operate the throttle valve of the carbureter C.

In Fig. 5 is shown the automatic governor arrangement applied to the heavier trucks made by the General Motors Co. In this construction a centrifugal fly-ball type of governor is encased at G and operates upon a rod inclosed in the tube indicated by the dotted lines T, which communicates directly with the throttle valve Vo f the carbureter C, indicated by the dotted lines V.

The arrangement of the governor employed on the Avery truck, and the principle of its operation, are quite clearly shown in Fig. 3. On this truck the governor is not inclosed and it is mounted at the upper end of a vertical shaft which, perhaps, was originally designed for the commutator of an ignition system. In this construction, as the speed of the motor increases the oval-shaped weights of the governor, which are hinged at the bottom and normally held closed by springs, swing outward, as indicated by the dotted outlines. A cam formation at the bottom of these weights raises a sleeve which operates upon the yoke lever L and this lever communicates with the valve V of the carbureter by means of the overhead rods R as shown.

As for the design of the governors themselves, or the governing mechanisms, they vary considerably on different makes of motors; and whereas most of those described and illustrated are what might be known as the fly-ball design, some are of the centrifugal ring type, such as is employed on the Locomobile.

The speeds at which the Chicago show

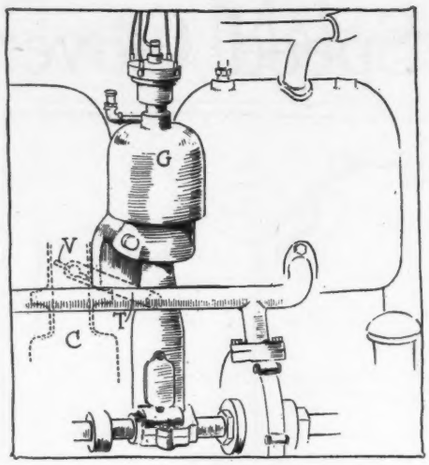


FIG. 5—A GENERAL MOTORS TRUCK GOVERNOR

trucks of various capacities are limited by the devices fitted, are shown in the table given herewith. The heavier trucks naturally operate at a slower speed than the lighter ones; the 1,000-pound vehicle being designed to travel at a maximum speed of about 20 miles an hour; the 1,500-pound vehicles being limited to speeds between 15 and 18 miles an hour, more or less, and vehicles in the 4,000 and 6,000-pound class being held down to a speed of 11 to 14 miles per hour. Few if any 7,000-pound vehicles are set for more than 12 miles an hur, and in the majrity of cases 9 or 10 miles an hour is considered more rational. The normal speed of a 10,000-pound truck is around 8 or 10 miles an hour, though some are shown to be limited to as high as 15 miles per hour.

The speed at which the vehicle is designed to run depends largely upon the service for which it is intended and the roads that it is required to negotiate; while the tires employed on the vehicle also must be taken into consideration. Where a car is used for long, steady runs over well paved roads it can be very successfully operated at a higher speed than if required to travel over rough or poorly paved stretches. Then there are times when a car is required to negotiate both good roads and bad roads in the course of its daily work and good advantage could be taken of a higher speed on the good roads if the driver could be depended upon to use good judgment in operating his vehicle. As for the tires, it stands to reason that a vehicle equipped with pneumatics can be run at a greater speed, with less damaging vibration to the mechanism, than a vehicle equipped with solid tires. For example, the Kelly 3,000-pound truck is limited to a speed of 15 miles per hour when equipped with solid rubber tires, and 20 miles an hour when pneumatic tires are fitted. In the same way, the Autocar is limited to from 12 to 15 miles an hour on solid tires and 20 miles an hour on pneumatics.

CONCERNS USING GOVERNORS

Car	Capacity, pounds	Miles per hour Normal	Maximum
Alden-Sampson	1,500	20	..
Alden-Sampson	6,000	13	..
Alden-Sampson	10,000	10	..
McIntyre	1,500	15	..
McIntyre	3,000	15	..
Atterbury	2,000	18	18
Federal	2,000	15	15
General M. T. Co.	2,000	15	15
General M. T. Co.	7,000	11	..
General M. T. Co.	10,000	9½	9½
Grabowsky	2,000	20	..
Grabowsky	3,000	15	..
Grabowsky	10,000	10	..
Lauth-Juergens M. C. Co.	2,000	15	20
Mack	2,000	17	17
Mack	3,000	16	18
Mack	8,000	10	14
Mack	10,000	8	12
Stegeman	2,000	18	..
Stegeman	4,000	15	..
Stegeman	8,000	10	..
Autocar	3,000	12	15
Decatur	3,000	15	..
Garford	3,000	12	..
Garford	10,000	10	12
Velie	3,000	15	15
Alco	4,000	17¾	..
Alco	7,000	12	..
Brodesser	4,000	13	14
Knox	4,000	12	15
Knox	7,000	9	12
Knox	10,000	9	12
Modern	4,000	15	..
Packard	4,000	14	14
Peerless	6,000	14½	..
Peerless	10,000	10 7-10	..
Pope-Hartford	6,000	12	..
Pierce-Arrow	10,000	13	13
Saurer	9,000	13	..
Locomobile	10,000	10	10
Stearns	10,000	12	15

LEGAL MOTORING NOTES

Women who own their own cars may have the satisfaction of knowing that a precedent has been set for their protection by a Canadian judge in a non-jury assize court. Mrs. Edith M. Hull, of Toronto, bought a car from a garage, one of the proprietors of which was her husband. The latter withdrew from the business and his partner was called upon to pay a judgment obtained against the garage by the Union Bank. He had the car seized. It was valued at $1,200, and Mrs. Hull's contention that the car was purchased by money that was obtained from her father and had not been taken out of the business by her husband and given to her, resulted in the return of her property.

In the Ontario legislature another amendment to the Canadian motor vehicles act has been introduced which will prohibit motor vehicles from passing a stationary street car, whereas the old act permitted them to pass at the rate of 4 miles an hour. A special penalty has been attached for neglect to carry a license number by the persons racing on highways, or failure to stop in case of an accident occasioned to other persons on the highway, or neglect to carry lights at night. For the first offense the penalty will be $50, or 1 week's imprisonment, and for the second $100, or 1 month's imprisonment.

Proposed amendments to the highway travel act will be inclusive of all motor vehicles, instead of those drawn by horses, or a traction engine, and the devil-strip right of way has been made to apply generally, instead of in larger localities. This means that vehicles going south and east have the right of way.

Current Motor Car Patents

PATENTS ISSUED FEBRUARY 13

1,016,978—Mechanical Movement. Willard Irving Twombly, New York, N. Y., assignor, by mesne assignments, to Twombly Motors Co., N. Y., a corporation of New York. Filed April 7, 1910. Serial No. 553,948.

1,016,981—Internal-Combustion Engine. Ray Carmichael, Indianapolis, Ind., assignor, to Indianapolis Gas Engine Co., Indianapolis, Ind., a corporation. Filed March 6, 1911. Serial No. 612,554.

1,016,987—Driving Mechanism. Walter O. Foss, Newington, Conn., assignor to Charles E. Bunnell and Richard Bradley, Branford, Conn. Filed February 23, 1910. Serial No. 545,410.

1,017,000—Vehicle Lamp. Joseph A. Joncas, Minneapolis, Minn. Filed May 17, 1910. Serial No. 561,860.

1,017,008—Engine. William Riley McKeen, Jr., Omaha, Neb., asignor to McKeen Motor Car Co., Omaha, Neb., a corporation of New Jersey. Filed August 21, 1909. Serial No. 513,915.

1,017,033—Turn-Table. Thaddeus C. Beach, St. Johns, Mich. Filed June 16, 1911. Serial No. 633,494.

1,017,073—Internal-Combustion Engine. Edward H. Belden, Pittsburgh, Pa. Filed November 8, 1911. Serial No. 659,204.

1,017,074—Internal-Combustion Engine. Edward H. Belden, Pittsburgh, Pa. Filed November 9, 1911. Serial No. 659,441.

1,017,080—Secondary or Storage Battery. James P. Clare, Stratham, N. H. Filed September 23, 1910. Serial No. 583,416.

1,017,171—Motor Car Wheel. Philip J. Rivers. New Rochelle, N. Y. Filed May 9, 1910. Serial No. 560,200.

1,017,212—Igniting Mechanism in Internal-Combustion Engines. Gottlob Honold and Arnold Zahringer, Stuttgart, Germany, assignors to the firm of Robert Bosch, Stuttgart, Germany. Filed December 17, 1909. Serial No. 533,630.

1,017,198—Electric Motor-Vehicle. Elmore W. Bender, Los Angeles, Cal. Filed July 13, 1910. Serial No. 571,703.

1,017,091—System of Indicating the Contents of Liquid-Containers. Oscar Frederickson, Chicago. Filed March 4, 1911. Serial No. 612,369.

1,017,216—Fluid-Clutch. Gustave T. Johnson, Chicago. Filed June 6, 1911. Serial No. 631,580.

1,017,226—Device for Indicating the Intended Movements of Vehicles. George S. Matthews, Kansas City, Mo. Filed November 29, 1910. Serial No. 594,786.

1,017,236—Vehicle-Wheel. Ivar L. Tvinde, Watertown, S. F. Filed March 9, 1911. Serial No. 613,419.

1,017,259—Elastic Wheel. Louis Antoine Garchey, Paris, France. Filed December 16, 1908. Serial No. 467,845.

1,017,300—Single-Spark Ignition System. Edwin S. Lincoln, Brookline, Mass., assignor to Electric Goods Mfg. Co., a corporation of Maine. Filed December 6, 1909. Serial No. 531,645.

1,017,304—Interrupter for Ignition-Dynamos. Charles T. Mason, Sumter, S. C. Filed January 12, 1911. Serial No. 602,170.

1,017,330—Spring-Wheel. Frank Smith, Rossville, Ga. Filed April 11, 1911. Serial No. 620,349.

1,017,335—Lock for Steering-Wheels. Theodore D. Stanley, Detroit, Mich. Filed June 5, 1911. Serial No. 631,447.

1,017,355 — Power-Transmission Apparatus. Herbert E. White, Youngstown, O. Filed January 25, 1911. Serial No. 604,573.

1,017,363—Wheel. James J. Adamsen, Brooklyn, N. Y. Filed May 15, 1911. Serial No. 627,182.

1,017,407—Transmission Mechanism for Motor Cars. Max H. Grabowsky, Detroit, Mich. Filed June 21, 1911. Serial No. 634,555.

1,017,453 — Gas-Engine Starter. John J. O'Leary, Healdsburg, Cal. Filed February 25, 1911. Serial No. 610,839.

1,017,456—Tire. William Pavlik, Bayport, N. Y. Filed September 22, 1911. Serial No. 650,718.

1,017,459—Electric Spark-Plug for Combustion-Engines. Leopold Podszus, Charlottenburg, Germany. Filed November 23, 1910. Serial No. 593,951.

1,017,466—Vehicle Wheel-Rim. George T. Reichenbach and Hartwig O. Peck, Portland, Ore., assignors to H. O. Peck Automobile Wheel Co., Incorporated, Portland, Ore. Filed May 9, 1911. Serial No. 626,018.

1,017,474—High-Tension Magneto-Electric Apparatus. Frederick Richard Simms, Kilburn, London, England, assignor to the Simms Magneto Co., a corporation of New York. Filed June 27, 1910. Serial No. 569,200.

1,017,485—Broken-Spring Repairer. John H. Warner, Mount Pocono, Pa. Filed June 29, 1911. Serial No. 635,939.

1,017,498—Piston for Explosive Engines. John Bittner, Newcastle, Ind. Filed February 7, 1911. Serial No. 607,101.

1,017,536—Silencer for Internal-Combustion Engines. Mark Frank Graydon, Trenton, Ontario, Canada. Filed October 9, 1911. Serial No. 653,730.

1,017,537—Combined Cap and Socket Wrench Used on and in Connection With Valves of Pneumatic Tires for Wheels. John H. Crowell, Vineyard Haven, Mass. Filed February 9, 1911. Serial No. 607,656.

1,017,572 — Attachment for Carbureters. James B. Lund, Chicago. Filed December 18, 1911. Serial No. 666,314.

1,017,592—Method of Working and Governing Internal-Combustion Engines. Thomas Rigby, Dumfries, Scotland. Filed October 16, 1911. Serial No. 654,942.

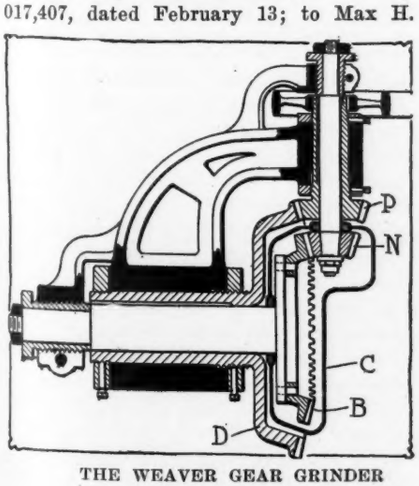
1,017,597—Magneto. James E. Seeley, Los Angeles, Cal., assignor to High Frequency Ignition Coil Co., Los Angeles, Cal., a corporation of California. Filed January 31, 1911. Serial No. 605,775.

1,017,612—Gear-Grinding Device—Robert B. Weaver, Detroit, Mich. Filed April 12, 1911. Serial No. 620,568.

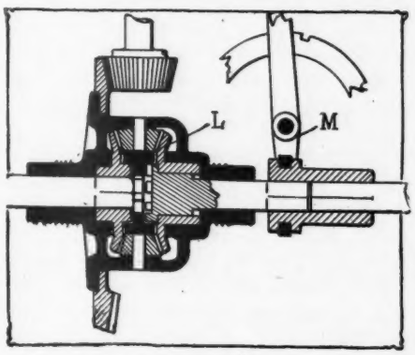
1,017,613—Process of Grinding Gears. Robert B. Weaver, Detroit, Mich. Filed October 4, 1911. Serial No. 652,866.

WEAVER Gear Grinding Process—No. 1,017, 613, dated February 13, to Robert B. Weaver, Detroit, Mich.—This patent covers a process of grinding gears by means of an abrasive like emery and oil, or some similar substance. The vertical shaft has a sleeve attached to it and there is a bevel pinion gear P at the lower end of this sleeve that coöperates with a large dish-shaped gear D secured to the horizontal shaft. The lower end of the vertical shaft is adapted to receive the pinion N to be ground, whilst there is a plate on the inner end of the horizontal shaft, to which the large bevel gear B may be secured. The brasive is obtained in a casing C which incloses the gears to be ground.

Grabowsky Differential Lock—No. 1,017,407, dated February 13; to Max H. Grabowsky, Detroit, Mich.—This patent pertains to a locking device for differential mechanisms, such as are most generally employed either in the jackshafts of chain-driven motor cars, or in the rear axles of shaft-driven vehicles. As shown herewith, the shafts are united by a differential gearing of the bevel-pinion design. This differential mechanism is provided with a ring L having an internal web with teeth formed therein. The inner end of one shaft portion also has teeth designed to mesh with those of the ring; and means M are provided to move the shaft longitudinally to engage and disengage the teeth upon its end with the teeth in the webbed ring L.

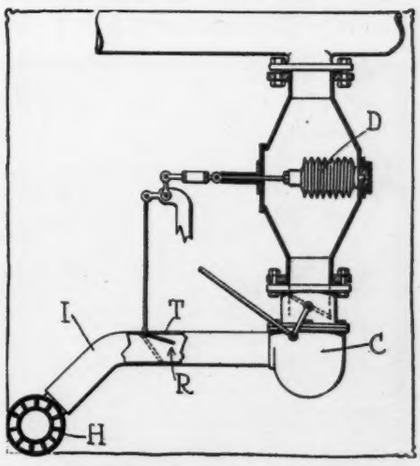


THE WEAVER GEAR GRINDER



GRABOWSKY DIFFERENTIAL LOCK

Lund Carbureter Attachment—No. 1,017,572, dated February 13; to James B. Lund, Chicago.—This patent covers a device for automatically regulating the temperature of air admitted to the carbureter of an internal combustion motor. As illustrated below. It is a combination of a carbureter C, and air intake pipe I, connected therewith and provided with a cold air inlet port T, and an air heating device H, connected with the pipe I, for heating the air drawn into the end of the pipe. Situated in a chamber arranged between the carbureter and the inlet manifold of the engine, there is a device D which is affected by the temperature and pressure of the fuel mixture passing from the carbureter; this automatically controls the operation of the shutter R to regulate the temperature of the mixture delivered to and from the carbureter.



LUND CARBURETER ATTACHMENT

Among the Makers

AN Aplco Appointment—R. B. DeLong, formerly of the Dayton Motor Car Co., has been made production manager of the Apple Electric Co.

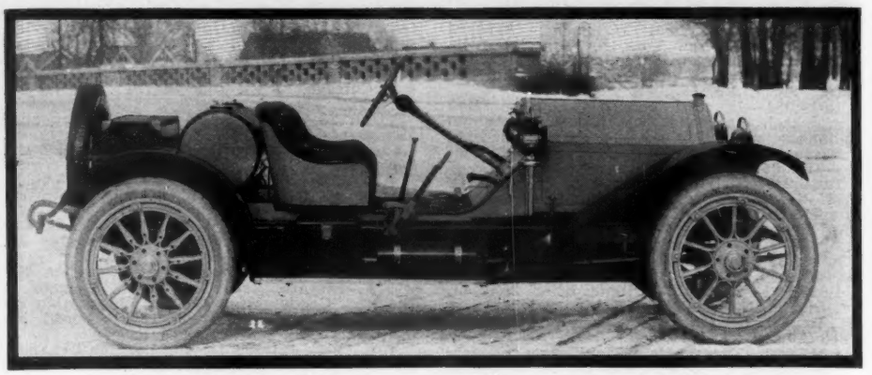
From Thomas to Stearns—S. N. Bourne, formerly western sales manager of the E. R. Thomas Motor Co., is now connected with the sales department of the F. B. Stearns Co., traveling through the west.

May Absorb Galion Plant—The Howard Motor Co., of Galion, O., has received a proposition from H. W. Woodward, president of the Cleveland Motor Truck and Mfg. Co., leading towards the absorption of the Galion plant by the latter concern.

Lucius French Resigns—The resignation of Lucius S. French as advertising manager and assistant secretary of the Henderson Motor Sales Co., has been announced. Mr. French will go to Portland, Ore., where he will become advertising manager for the Eiler Piano Co.

Forming S. A. E. Hoosier Branch—An Indiana branch of the Society of Automobile Engineers will be organized at a meeting to be held in the rooms of the Hoosier Motor Club in the Claypool hotel, Indianapolis, Friday evening. Officers will be elected and a constitution and by-laws adopted. About eighty members of the S. A. E. reside in Indiana and half of these are located in Indianapolis, so that a strong branch should result.

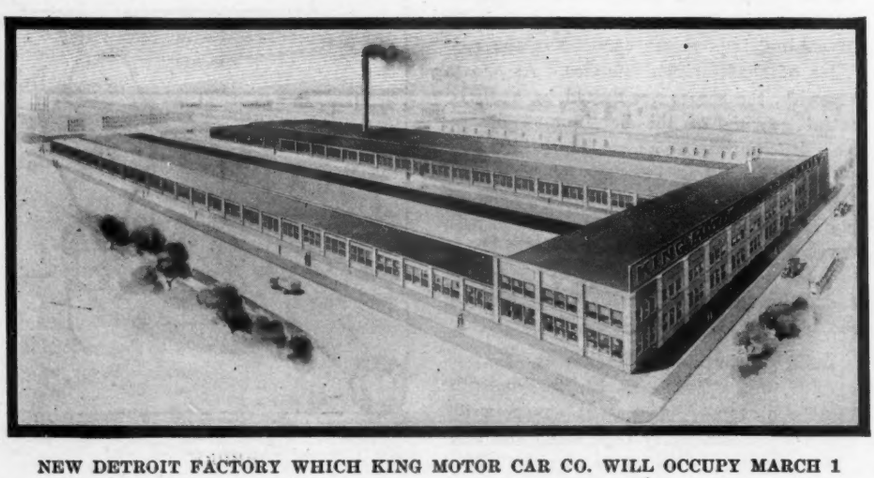
Remy Statistics—To date the Remy Electric Co., of Anderson, Ind., has an aggregate of 615 tons of highly magnetized steel traveling about the world, supplying—together with co-parts—ignition to 312,500 tons of motor machinery. This quantity of magnet steel if flattened into one sheet 1-16 inch in thickness, would make 23,370,000 toy magnets 1½ inches by 2 inches over all; or, more than enough to give one magnet to every child in the United States. Figuring this amount in steel wire, say No. 36—the size used in copper for secondary windings in coils—it is evident that there would be wire enough to encircle the globe 139 times—3,494,319 miles of wire, or 18,450,004,320 feet. From 615 tons of magnet steel it would be quite possible to produce sufficient ordinary size telegraph wire to establish communication between the Remy factory, Anderson, and its forty-seven service stations.



STUTZ BEAR CAT, NEW ROADSTER MODEL JUST OUT

Drawback for Simms—The treasury department at Washington has authorized the collector of customs at New York to allow a drawback of duties on magnetos manufactured by the Simms Magneto Co., from imported screws, gears, wheels, springs, magnets and other materials. The quantities of the various imported materials upon which drawback may be allowed must not exceed the quantities actually used and as claimed in the entry.

King Gets New Plant—The King Motor Car Co., now located at 1559 Jefferson avenue, Detroit, will move to the factory at present occupied by the Hupp Motor Car Co. as soon as the latter is installed in its extensive new works, which will be about March 1, it is expected. This move will give the King company approximately 70,000 square feet of floor space and a capacity of 5,000 cars per year. The factory is of modern construction, having been erected in 1909, and comprises a group of four buildings, all connected, with a frontage of 130 feet on Jefferson avenue. It is built of cement blocks and there is an administration building of two stories, containing more than a dozen private offices, a large general office and several smaller offices for stenographers, etc.



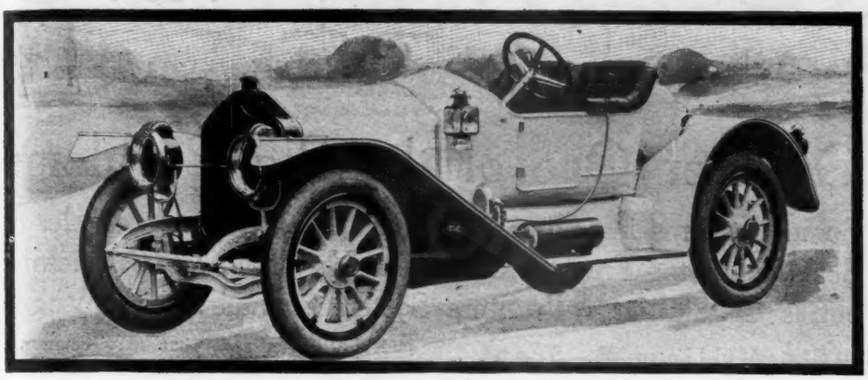
NEW DETROIT FACTORY WHICH KING MOTOR CAR CO. WILL OCCUPY MARCH 1

New Beaver Motor—The Beaver Mfg. Co., of Milwaukee, announces the addition of a small block motor to its line. The influence of the latest foreign practice is evident from the bore and stroke, of 3¼ inches by 5 inches.

Locates at Fulton, N. Y.—The Parker Transmission Appliance Co., now of Springfield, Mass., will within a month occupy the top floor of the Hunter Arms Co. plant at Fulton, N. Y. The Parker company is incorporated under the laws of Massachusetts and is capitalized at $1,000,000, and will make a device invented by Clark Parker, who has been experimenting with transmissions for 3 years, also with clutches, and now claims to have a device that does away with friction between gears. The transmission and clutch are of the all-in-mesh type.

Gives Lighting System Acid Test—The Esterline Co., Lafayette, Ind., manufacturer of the Berdon lighting system, recently gave its lighting system an acid test by placing a complete system, including the electric generator and the controlling system, in a large glass jar, immersed in a bath of clear water to which was added a small amount of sulphuric acid. The generator and controller were operated continuously, the generator being driven as a motor from a 6-volt storage battery and through the automatic controlling system. Small lamps were placed in front of the generator and controller to illuminate the interior of the vessel. It is reported that at the end of the first week, all the metal parts of the generator and controller were badly eroded and the interior of the controller filled with copper sulphate and sediment. There also was ½ inch of sediment in the bottom of the jar and on the board on which the equipment rests. Despite this, it is said, the system continued to oper-

and Dealers



ONE OF NEW SERIES V ROADSTERS OF NATIONAL LINE

ate satisfactorily for a second week, although both the generator and controller were so covered with sediment that they scarcely could be seen.

Bailey on Republic's Staff—Charles E. Bailey has taken charge of the sales and advertising of the Republic Motor Car Co., Hamilton, Ohio. This concern has just completed a new factory building which will enable it to materially increase its output for the coming year.

Pittsfield Denies Rumor—Emphatic denial is made by the Pittsfield Spark Coil Co. of Dalton, Mass., of the rumors current during the Chicago show that the concern had gone into the hands of a receiver and that an accountant was busy on the books. It is pointed out that, doubtless, this rumor was caused by a confusion of names, the Jacobson & Brandow Co. of Pittsfield, Mass., making a magneto, being in a receiver's hands, there being no connection between the two. The Pittsfield Spark Coil Co. claims it is running its plant to its full capacity, and that it has just placed a new magneto on the market.

Gutelius Resigns—Nelson T. Gutelius, who recently engaged with the Midland Motor Co. of Moline, Ill., as sales manager, has resigned and severed his connection with the Midland company.

Seeking Factory Site—E. W. Jackson of the Jackson Engineering Co. of Wilkes-Barre, Pa., is seeking a location for a factory to build a 1-ton truck designed by Mr. Jackson.

Detroiter in New Plant—The Briggs-Detroiter Co., manufacturer of the Detroiter, is now at home in its new factory of reinforced concrete at 475 Holbrook avenue, Detroit. The structure is 250 feet long and 100 feet wide and is equipped to turn out 1,000 cars between now and July 1. The foundation is in for another building of the same size, adjoining the one just completed. The factory is unusually well-lighted and the shipping facilities are excellent.

Places Big Steel Order—The Stevens-Duryea Co. has placed an order for 4,000 tons of structural steel to be used in the construction of its new buildings at East Springfield, Mass.

Edwards Going Abroad—H. J. Edwards, fourth American licensee of the Knight motor, will accompany Charles Y. Knight to Europe for the purpose of inspecting the Daimler, Mercedes, Panhard, Minerva and other plants.

Velie's Truck Plant—The truck plant of the Velie company already is in operation so far as the first floor is concerned and work is being pushed on the two buildings which will form this unit. The larger building, now in process of construction, is 400 feet long and 160 feet wide, while its mate will be 60 by 80 feet and will be used as a motor test room.

Big Fire at Detroit—Fire originating, it is supposed, from an overheated steam-pipe, practically cleaned out the store of the Goodyear Tire and Rubber Co., 251 Jefferson avenue, Detroit, February 12. The company's loss is about $100,000, practically covered by insurance. Four thousand tires and their wrappings were destroyed. The damage to the building, which is owned by the Wollenburg estate, is about $25,000. The Huron Radiator Co. and the Chauffeurs' Auxiliary Club, which were located in the burned structure, sustained losses of about $500 each. The Goodyear company recently awarded contracts for the erection of a five-story building on Jefferson avenue. Pending its completion temporary offices have been established in the branch at 846 Woodward avenue.

Coming Motor Events

Pittsburgh

February 17-24—Pittsburgh show; Pittsburgh Automobile Show Association, T. I. Cochran, manager, Pittsburgh, Pa.

February 17-24—Show at Newark, N. J.; New Jersey Automobile Exhibition Co.

February 17-24—Cleveland show; Cleveland Automobile Show Co., F. H. Caley, manager, Cleveland, O.

Minneapolis

February 17-24—Minneapolis show; Minneapolis Automobile Show Association; H. E. Pence, manager, Minneapolis, Minn.

February 18-24—Annual show Portland Automobile Dealers' Association, Portland, Maine.

February 19-24—Show at Hartford, Conn.; Automobile Club of Hartford.

February 19-24—Seventh annual show of Omaha Automobile Association, C. G. Powell, manager, Omaha, Neb.

Cincinnati

February 19-25—Annual pleasure car show; Cincinnati Automobile Dealers' Association, E. A. Kruse, secretary, Cincinnati, O.

February 20-24—Show at Binghamton; Automobile Dealers' Association; R. W. Whipple, secretary, Binghamton, N. Y.

February 20-25—Show of Automobile Dealers' and Traders' Association, New Orleans, La.

Baltimore

February 20-28—Annual show, Baltimore, Md.; Baltimore Automobile Dealers' Association.

February 21-28—Toronto show; Canadian National Automobile Association; W. J. Ross, secretary, Toronto, Canada.

February 20-28—Annual show, Baltimore, Md.

February 22-24—Show at Bloomington, Ill.

February 24-27—Taunton, Mass., first annual show; D. D. Corbett, manager.

February 24-March 2 — Annual show; Brooklyn Motor Vehicle Dealers' Association, Brooklyn, N. Y.

February 26-28—First show at Charlotte, N. C.

February 26-29—Annual commercial exhibit; Cincinnati Automobile Dealers' Association, E. A. Krause, secretary, Cincinnati, Ohio.

February 26-March 2—Show at Paterson, N. J.; Paterson Automobile Trade Association.

February 26-March 2—Second annual show Elmira Automobile Club, L. Blumenstein, manager, Elmira, N. Y.

February 26-March 2—New Haven, Conn., annual show.

February 26-March 2.—Show at Sioux City, Ia., of Sioux City Automobile Dealers' Association.

February 26-March 3.—Mississippi Valley show, Quincy Automobile Club, Quincy, Ill.; Harry F. Hofer, director.

February 28-March 1—First show New Bedford, Mass.; D. D. Corbett, manager.

February 28-March 2—Annual Davenport show; Woodworth Clum, manager, Commercial Club building, Davenport, Ia.

MARCH

March—Show at Norfolk, Va.

March 2-9—Columbus, O., show; Columbus Automobile Club.

Boston

March 2-9—Pleasure car show, Boston; C. I. Campbell, manager.

March 4-9—Show at Des Moines; C. G. Van Vliet, secretary, Des Moines, Ia.

March 4-9—Show at Reading, Pa.

March 4-9—Show at Newark, O.

March 5-6—Show, Madison, Wis.; Madison Automobile Dealers' Association.

LOUISVILLE

March 6-9—Fifth annual show at Louisville, Ky.; Louisville Automobile Dealers' Association.

March 6-9—Advertisers' motor show, Tiffin, O.

March 11-16—Show at Cedar Rapids, Ia.; M. P. Beck, manager.

DENVER.

March 12-16—Show at Denver; G. A. Wahlgreen, manager, Denver, Colo.

March 12-16—Show at Syracuse, N. Y.; Syracuse Automobile Trade Association; Syracuse, N. Y.

March 13-20—Show of Boston Commercial Motor Vehicle Dealers' Association, Mechanics' building, Boston; C. I. Campbell, manager.

March 25-30—Tent show at Indianapolis, Ind.; Indianapolis Automobile Trade Association.

The Realm of the

Operator One of the Big Problems

Some Concerns Promote Drivers of Their Horse Vehicles to Seats on Motor Trucks—Chauffeur May Know His Machine but is Unfamiliar with Store System of Delivery in Vogue

By William B. Stout

A LARGE part of the success of a motor truck depends on the driver. A poor driver can spoil the best truck, while a good driver can cut down the repairs and depreciation to a surprising figure, even with trucks of mediocre make. Trucks nowadays are made as fool-proof as may be, and yet the driver question is a big one. Here is another line where the experience with the older horse systems is drawn upon to furnish a basis for a start, and many lessons have been learned by different firms as to the best method of handling the driver problem in their work. Again we find systems which fit one case which do not apply in others, but from each experience and method may be gotten points which will assist materially as a basis for a start further than merely with horse experience.

Some firms assert it is a waste of time to try to get your old horse driver to handle the truck. He may be able to learn the mechanism all right and handle things well, but he is apt from the start, they say, to have the spirit of the horse driver. With his motor truck to deliver with, his work is hurried to a point where in the loading and unloading he has twice the lifting that he had with the horse system, and he cannot go to sleep on the road with the reins over the dashboard, while the truck runs itself. He must work faster, keep his head working all the time, and is likely to think himself an abused unit of the working classes. The fact is, he has been given the opportunity to rise to a higher intellectual level, with pay to fit—though some firms seem to think the added compliment of allowing him to drive the truck should be enough compensation for him without added wages.

Truck Driver High-Class Man

A truck driver is a higher class man than a mere teamster and should be paid accordingly, but at the same time this should not make him so chesty that he is not willing to do the unloading when the truck gets to its destination. This is one drawback with many. By hiring a chauffeur some firms think to gain in the proper handling of their truck, but when they get him, as Mr. Kirby of the Fair, Chicago, said, he is apt to know little but the truck, and nothing of the delivery system. To be a good delivery driver a man must know his city, his warehouse platforms and the men about them, the docks and shipping arrangements, so as to save time and friction here and there.

A hired chauffeur, say those who believe in educating their old horse drivers to truck use, cannot know the delivery conditions with which old drivers are familiar, and it is more important that he should have this knowledge than merely a mechanical one. It takes a little time to train him to run his car right, but less time than it takes to teach a chauffeur extensive systems and to learn customers.

Caring for the Truck

Thus there are two schools of precedure in the matter of drivers. Where the acquaintance with routes, docks, freight houses, etc., is the big thing, it seems best to educate a horse truck driver to run the motor vehicle, but where there is nothing of especial gain in this, as where a truck merely makes a trip to a sub-station and back or runs on an interurban route, a trained chauffeur would undoubtedly work to greater advantage.

Should the driver take care of his own truck?

There seems to be a tendency toward this with many firms using small trucks, such as those of the Chicago city library. The truck generally is given into the charge of the driver, so far as the machinery is concerned. The washing, etc., is tended to by the night garagemen. With the larger sizes there is a division.

With the Fair, Chicago, the driver takes care of such repairs as he can handle, such as chain breakages or minor troubles on the road, and when he comes in at night he hands in a garage slip, hanging it on a hook on the garage wall. This card is marked with anything which may need attention on the truck. If the clutch is inclined to slip or the carbureter feed pipe leaking, this is noted, so that when the night man looks at the card he knows just what he has to do. Any bigger repairs, such as fitting new sprockets or tires, are left to the discretion of the powers that be after the driver has reported the need. If they think the suggested repair can be delayed a little their word goes, of course. On the back of the report card may be noted any special conditions, such accidents, etc., that may come up.

The Hub Clothing Co. uses the same system with drivers, but goes a bit further in that after the repair is made, as noted on the slip, the garage man notes on the card what the cause of the breakdown was, according to his opinion, so that if there is any reckless driving or a careless accident this will be reported. Whether this idea is of any real value in the system depends on the garage man and how he could be best approached. With the right kind of a garage man the idea is good, with the wrong kind worse than useless, as it would then encourage deceit, both on the part of the drivers and the repair department, especially with the firm paying a bonus each month for the driver who turns in the best report for the month, as does the Hub.

Bonus System Discussed

This but brings up another point, as to whether the bonus system is worth the while. It is aimed of course to mean an extra amount of money in the pay envelope of the driver who takes the best care of his car, uses it with the most caution on the road, and shows the fewest accidents, in order that any reckless handling or careless driving will be eliminated. The Hub is but one of many firms using this method of obtaining intelligent and conscientious service from its drivers. Most firms, however, prefer to pay wages in the first place which are consistent with the class of a really good driver, and for this amount expect his best service. If it is not forthcoming it is the policy of the firms to get someone then who will furnish service of this kind. This method is an encouragement to efficiency all the way through, and each driver gets his share of the bonus—which would be paid to one man in the other case—in increased pay. There is in this case no extra incentive to dope up report sheets, and as a result, in the belief of the users of the non-bonus scheme, the report sheets are more accurate. At the same time the firm itself can keep as accurate a record of each driver's performance as by the other method, and any extra efficiency on the part of any one driver can be re-

Commercial Car

Road Problems that Drivers Encounter

Varying Conditions Require Different Systems—Bad Going Demands Careful Piloting—Discussion of Advantages and Disadvantages of Bonus System—Tire Economy as Demonstrated

warded by a raise in wages. In this line, as in others, business men are finding that an A1 man is rare, and when found is worth good wages. Good wages, too, attract good drivers, and a poor driver is a wasteful economy.

The city library of Chicago probably holds the record for efficient service in proportion to cost over any other delivery system in the Windy City, and William A. Purer, in charge of this department, is not in favor of the bonus system.

Against the Bonus

"We have good drivers, every one of them, and we treat them well," he said. "How well is proved by the fact that all of them have been with us for several years, in spite of the fact that they are driving old trucks far from up-to-date. Burchard took our first truck and is running it yet.

It took but a glance at the power plant in Burchard's car a few minutes later, and without any previous notice to him, to see that he had the interest of his car and its service at heart and, though the outside of the truck looked far from clean, with the body dingy and the wheels crusted with mud, due to the fact that there was not enough money available to keep a man on hand to wash the cars and the drivers spent their time on the machinery, the working parts were spotless, with all brass parts polished to the limit, no oil on the outside or in the cracks, every part adjusted, and when the car started it was no surprise to hear the cough of the one-lunger start merrily at the first turn of the crank.

In the matter of tire wear, and especially the extra wear of the front wheel tires, Mr. Purer stated that this was due to the car tracks, and gave another interesting sidelight on the treatment of the drivers when he said that the matter of running in the tracks was left to the discretion of the drivers, who understood circumstances better than one at the office could. Where there were roads suitable they drove on them, but where the track was an advantage to service it was better to run there than to wear out springs, etc., by the extra vibration of a bad road.

Each a Separate Problem

With each firm using trucks there is a separate driver problem. A firm which covers a territory of bad roads and hilly streets has a different solution to arrive at from the firm whose hauls are over level asphalt streets in uncongested districts. A truck operating in narrow streets needs a different kind of treatment than the truck which can use the boulevards, while there is a deal of difference between driving on asphalt and cobblestone, or macadam in poor repair.

Bad roads take careful driving to save springs and unnecessary jars, and for territory of this kind a governor will have to be set at a lower speed to keep the driver within limits. Hilly districts demand attention in the matter of brakes and their care and use, for brakes are easily abused, to the detriment of every

MOTOR TRUCK EXPENSE STATEMENT.

Month ending _____ 191_

	NO. TON	NO. TON	NO. TON	NO. TON	NO. TON	NO. TON	NO. TON	NO. TON	NO. TON	NO. TON	NO. TON	NO. TON	TOTAL	DAILY AVE.
Gasoline														
Oil														
Electric Current														
Batteries														
Grease														
Carbite														
Other Supplies														
Tires														
Repairs to Machinery (Routine)														
Repairs to Machinery (Accident)														
Repairs to Body & etc. (Routine)														
Repairs to Body & etc. (Accident)														
Salary														
City and State Licenses														
Insurance														
Depreciation														
TOTAL														
Average cost per day														
Day's in Service														
" " Shop														
" " Reserve														
Odometer Reading														
Mileage														
Miles average per day														

MONTHLY EXPENSE SHEET OF SYSTEM USED BY TH E FAIR IN CHICAGO

part of the truck. At the same time, much climbing of hills means a superior engine knowledge for best results, compared with ordinary driving conditions. A driver who can jockey his motor, getting the most out of it without knocking or extra wear and tear, is the kind wanted for this kind of work.

If a car is operating in a level country the greater part of the running condition can be taken care of by a properly adjusted governor, although in those localities where raised street crossings are used even a governor will not save a truck from misuse in the hands of an incompetent or careless driver.

A truck operating continually in narrow streets is constantly subjected to extra strain in the steering knuckles and controls, especially if the driver be one who enjoys taking the corners at as high a rate of speed as he thinks safety will allow. A machine operating on highly cambered roads is continually subjected to a strain on the springs on the low side, so that some makers are even fitting an extra leaf in the right-hand spring so as to take care of the extra strain. This arrangement might have an effect in influencing the driver to keep on the right side of the road during service.

The matter of keeping at the right side of the road is a problem which offers itself in almost every line of city delivery service, especially on the streets where there are car lines, where a truck is apt to be held up by a single vehicle between the street car and the curb on his side of the street. Not wishing to stop, very naturally, the driver if he sees the traffic is in any measure clear, will swing out onto the wrong side of the car to pass. In most of our cities, whether the driver do this or not, is up to his own discretion, although some of the cities are very strict in the matter of making traffic keep to one side. This is a problem, though, which is wholly tied up with the traffic problems of each separate city, so that no hard and fast rule can be laid down as to whether a driver always should keep to the right or not. Where the city has duly considered conditions and makes the rule that the laws of the road shall be absolutely obeyed, the firms whose machines are operating in that city should insist that the drivers live up to the law.

In some of the larger communities where a large amount of hauling is done by contracting firms along a certain route, these firms generally instruct all of their horse drivers to give the motor trucks of their own concern right of way and every advantage possible, realizing that if the truck is hindered by their horse drivers its efficiency will be so diminished that there will be no advantage over horse service. Here is a case where even the control of the horse drivers enters into the efficiency of truck service, so that the matter of the driver of the truck itself is not the entire problem.

DETROIT ELECTRIC USED IN TEXAS HOTEL SERVICE

A DETROIT electric hotel bus has just been put in service by the Hotel Brazos, Houston, Tex., which has seating capacity for fourteen passengers and provides comfortable accommodation for the guests of the hotel to and from railroad stations. Baggage is carried in a roomy rack on top of the vehicle, accessible by means of a ladder in the rear. This feature is much appreciated by passengers, as it does away with the unpleasant blocking of the aisle with suitcases, bags, etc. The speed of 11 miles per hour is neither excessive nor too slow for rapid service. The interior of the vehicle is electric-lighted, and the electric hotel sign on top of the bus acts as a welcome greeting to guests arriving on night trains. The windows of the car, all of which may be dropped in warm weather, are of French plate glass, equipped with anti-rattlers. The battery consists of 60 A-6 Edison cells. The tires are solids, 34 by 3½ inch front, and 36 by 4 inch rear. Already the bus has become a popular institution.

Virginia Test Shows Motor Superiority

A BIG fire in Richmond, Va., recently was the means of demonstrating conclusively the superiority of the modern motor-driven fire apparatus over the old type. For 13 hours a big Knox pumping engine kept two streams going on the fire practically without intermission and within a few minutes after it returned to headquarters it was ready for another call.

During the entire time the engine was working, from just before 6 p. m. until it was ordered back to quarters by Chief Joynes at 7 a. m., the chauffeur, who also was engineer and mechanician, occasionally poured a bucket of gasoline into the tank and went over his machine with an oil can.

The steam fire engines at work during the same period each required two men in attendance, an engineer and a fireman. Their total consumption of fuel was more than 25 tons of steam coal. The bill for running the gasoline pump at full speed for 13 hours came to $4.50.

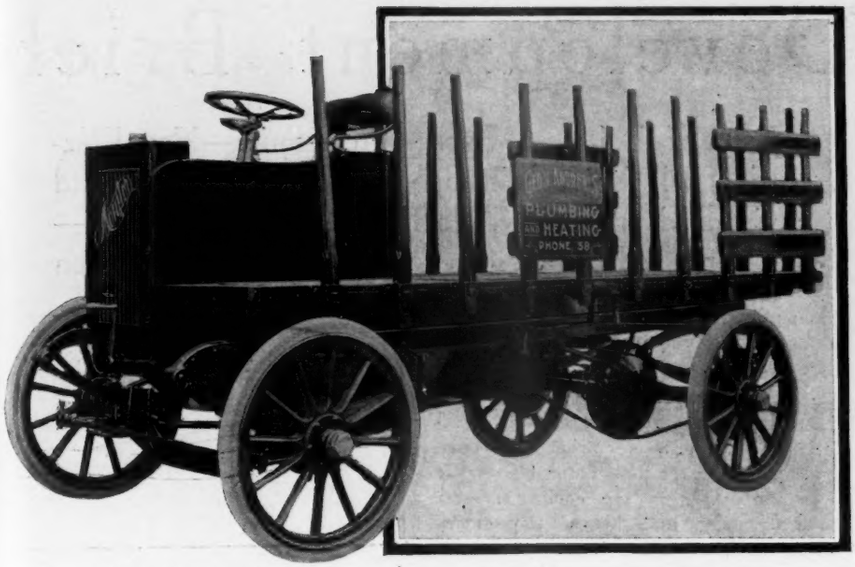
A few minutes after 7 o'clock the engine backed into its house, had its tanks filled, its parts oiled, and the driver reported it ready for duty.

This big Knox engine really is an entire fire department in itself. It is propelled by the same motor that works the pumps, a six-cylinder, 60 horsepower. It carries a 35-gallon chemical tank with hose and 1,000 feet of water hose. When not in action it has no horses to feed and its cost of maintenance between fires is practically nothing.

The work done at this fire removed the last doubt from the minds of the fire commissioners at Richmond and already the matter of motorizing the entire fire department is being agitated.

MOTOR BLACKSMITH RIG

In connection with the proposed motor equipment, Director Howard B. Oursler, of the Pittsburgh bureau of supplies, has recommended to the council the purchase of a motor truck to be supplied with a forge and blacksmith outfit for the purpose of shoeing the fire department horses while it is necessary to retain them in the service. The director explained that the establishment of a municipal blacksmith shop would require bringing hundreds of horses from distant fire engine houses, regardless of where the shop might be located, while many fire horses cast shoes while going to fires. It is suggested that a movable shoeing establishment could make the rounds of the fire engine houses and visit the various public works stables and thus save time now spent in taking the horses to blacksmith shops.



MONITOR TRUCK BODY FOR CARRYING LONG BOARDS OR GAS PIPE

THE Monitor Automobile Works, of Janesville, Wis., has brought out a novelty in the truck field as far as the design of the body is concerned. It is a truck which is built to meet the needs of the concern which has to transport lengthy articles such as long boards or water and gas pipes through city streets.

Half of the front of the machine has been left open, unobstructed by radiator or engine. This permits the long pieces of lumber or pipe to be shoved up alongside of the driver and the radiator. The control levers and the steering wheel are placed on the right, and the radiator extends over half of the front only. One advantage of this arrangement is that the load may be placed on the truck so that its center of gravity is in the center of the vehicle, thus causing the front wheels to take their share of the load. When the timbers or boards are of any great length, if it were not for this front opening, they would have to be loaded so as to have a considerable rear overhang.

Pittsburgh Bus Carries Thirty-One Passengers

WHAT is alleged to be the largest inclosed passenger motor car ever built is now in course of construction in Pittsburgh. When completed the body of this vehicle will accommodate thirty-one persons.

The new car is being built to the order of James J. Flannery, Jr., and is designed primarily for a funeral car. The body is being constructed by the L. Glesenkamp Sons & Co., and will not only carry thirty-one passengers, but is being equipped with a special compartment for carrying a coffin. Other novel features will be the installation of a modern lavatory with drinking water and glass holder. Water will be drawn from a tank in the ceiling. A telephone will be placed in the rear compartment to enable the passengers to communicate with the driver. The car is being upholstered in maroon-colored leather; the floor covered with linoleum and maroon carpeting. The ceiling will be covered with felt to deaden the sound. Spring cushion seats will be provided. Provisions are being made for three electric domes in the rear compartment and two in the casket compartment. The outside body panels will be painted in maroon with black moldings and body striping of carmine.

The dimensions of the car are: from dash to rear of body, 21 feet 2 inches; length over all, 25 feet 7 inches; height on inside, 6 feet 6 inches clear; width inside, at casket compartment, 7 feet 3 inches; with a door at casket compartment 34 inches. The car body will rest on a Packard chassis propelled by a 75-horsepower engine.

While the car is being designed for funeral purpose primarily, it will also be employed for conveying parties on other occasions. In either case a large party can be conveyed under one roof and in one vehicle; thus saving expense and adding convenience.

IN THE MARKET

The Eau Claire, Wis., common council is considering the purchase of three motor fire trucks, the first to be installed before summer. The committee in charge consists of Mayor J. T. Fleming, Councilman Huebsch and Chief Welch of the fire department.

Mayor Goodland of Racine, Wis., has sent a message to the common council urging the immediate purchase of three motor fire engines to replace all horse-drawn steamers.

As a result of agitation on the part of many property owners, Mayor Daniel W. Badger and Chief Engineer John D. Randall of the fire department at Portsmouth, N. H., have recommended to the city council that it take steps at once to purchase a motor chemical and hose wagon for the better protection of property. It is expected that the city council will act favorably upon the matter at its next meeting.

Motor-driven fire-fighting equipment will be supplied Columbus, Ohio, if an ordinance introduced in the council recently which provides for $50,000 bonds is and recently referred to the finance committee. Combination hose and aerial trucks of the latest models will be purchased in the event it is decided to expend the money. It is the plan to keep the proposed equipment in as nearly the central portion of the city as possible so that it will be available to reach all fires without delay.

TWO MORE CONVERTS

As a result of the first motor show, which closed in London, Ontario, 10 days ago, the council there has been requested to let appropriations for motor fire apparatus and a motor police patrol. Later, it is stated, motor ambulances will be put in service and also motor mail collectors. Mayor Philip J. Keller, of Niagara Falls, N. Y., who attended the London exhibition, put the matter of a motor police patrol before the police board of his city, and the motor patrol will make its first appearance on Niagara Falls streets in about 2 weeks.

MINNEAPOLIS FIGURES COST

Minneapolis has established a municipal garage with shop for repair work and maintains an accurate record of upkeep cost against the various departments. The record has been maintained 6 months and includes such details as expenditures for oil, gas, new parts, tires and casings and repairs. The record for price, date of purchase, monthly expense, total mileage and total cost as announced by the city officials is as follows:

	Total expense a month	Av. mileage a month	Cost a mile
Street Lighting—			
Maxwell, roadster—$728 July, 1910	$123.39	1,827	$.06
Waterworks department—			
Mitchell, five-passenger, engineers, $1,000 May, 1910.	231.64	1,219	.19
Buick, five-passenger, street service, $1,075 June, 1909.	38.06	798	.04
Schacht, truck, tapping, $749.50 May, 1910	20.76	514	.04
Van Dyck, truck, tapping, $850 May, 1911	49.43	787	.06
Hudson, roadster, city engineer, $1,150 June, 1910.	68.88	535	.13
Engineering department—			
Buick, five-passenger, paving	51.09	908	.06
Velie, five-passenger, sewers.	46.44	540	.09
Mitchell, five-passenger, sewers	34.45	1,093	.03
Buick, roadster	9.83	250	.04
Police department—			
Headquarters	83.88	1,429	.06
Patrol, first precinct	86.42	747	.12
Patrol, third precinct	73.58	624	.12
Ambulance	32.53	321	.10
Average per car	$ 67.88	892	$.08

These statistics should be of great interest in other cities whose officials have not kept such accurate records as have the authorities in Minneapolis.

Development Briefs

Some of the Latest Motoring Accessories—New Electric Drill for Repairshop—Combination Motor and Car-Body Heater—Motor Primers and Self-Starters—Compressed-Air System for Automatic Tire Inflation

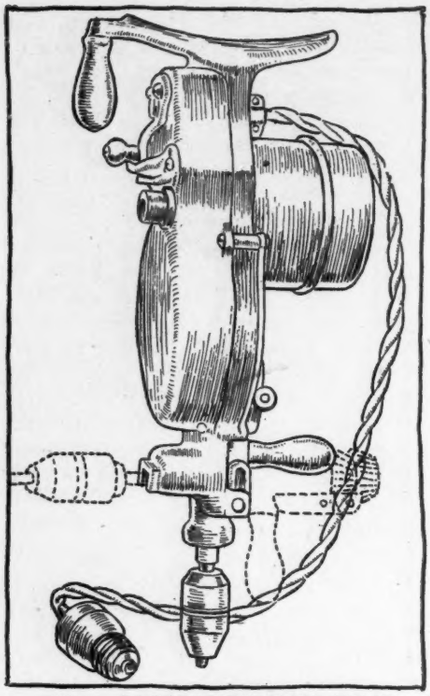


FIG. 1—BUCKEYE ELECTRIC DRILL SHOWING BREAKOVER

Buckeye Electric Drill

A PORTABLE power-operated drill for amateur or garage repairing is illustrated in Fig. 1. It is the product of the American Foundry Co., Leipsic, Ohio. In designing this drill the convenient shape of the breast drill has been retained and adapted to a motor drive. The motor can be obtained for either alternating or direct current of any desired voltage, and a combination winding is also supplied which can be used with both alternating and direct currents. Reversal of the motor reverses the drill and allows it to be used to advantage for tapping. The switch is located on the drill and is entirely encased, a single lever throwing it to forward, off and reverse positions. A very unique and convenient feature is the break-over movement to the spindle sleeve whereby the spindle is brought into locking position as indicated by the dotted lines. The spindle in this position is held from turning by jaws on the main frame, thus making it easy to tighten the chuck to any extent required, or to loosen it when necesary.

James Fuel Thermos

The International Motor Service Association, New York, is marketing a combination car heater and motor heater. It keeps the water in the cooling system above freezing and keeps the entire motor warm, rendering it easy to start, and overcomes the disagreeable features of a cold motor. It keeps the gasoline at a temperature of evaporization, keeps the interior of the body of a limousine or taxicab warm, and provides foot warmers for the driver and passengers of an open touring car. The arrangement is illustrated in Fig. 2.

This is all accomplished by a small gas burner housed in a neat brass tank on the running board of a motor car. The gas is generated from the gasoline of the car by the same system used in steam cars. The brass housing in which the heater is enclosed is about half the size of an ordinary gas generator, and is located on the step or running board of the car. The bottom is filled with a gauze, which makes it impossible for even a liquid gasoline to blaze up. The burner is provided with a thermostat which automatically keeps the gas line open when the burner is burning, and automatically closes the gas line the moment the burner goes out.

Above the burner is a coil through which the cold water runs, is heated and returned to the circulating system at the lowest point of the water just beneath the radiator, and as hot water always rises, it passes through the water of a lower temperature, and rises to the tops of the cylinders and radiator. The colder water which is drawn out from the bottom, enters the other pipe and proceeds to the heater; thus not only keeping in circulation at all times, but supplying hot water radiation for the body of the car, keeping the interior of the car at summer heat.

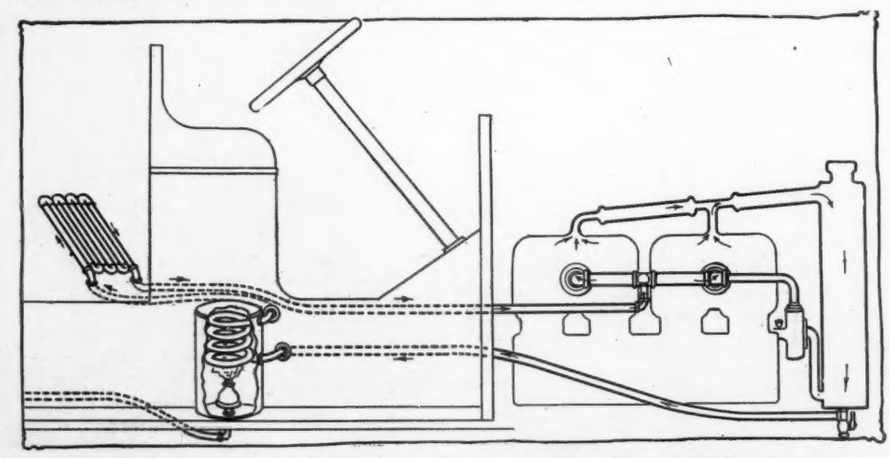


FIG. 2—JAMES FUEL THERMOS FOR HEATING MOTOR AND INTERIOR OF CAR

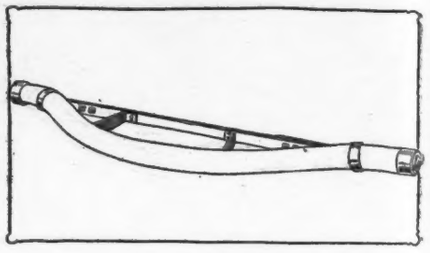


FIG. 3—NEW CUSHION FENDER

Knickerbocker Air Starter

The Knickerbocker compressed air self-starting, tire inflating system, made by J. Knickerbocker, San Diego, Calif., is illustrated in Fig. 5. It consists of a small air-compressor attached to the engine, a storage tank and connections to the hubs of the wheels, with a permanent connection to the tire valves. The compressor is capable of pumping and storing air at a pressure of 250 pounds in a reservoir of 2,700 cubic inches capacity. The air can be used for starting as well as inflation and is stored in the reservoir automatically. A feature of the system is that tire inflation may proceed while the car is running, so that leaky tubes do not necessitate a stop, as the tires can be kept at the proper inflation pressure by continuous replacement of that lost by leakage. The motor can be started and run on compressed air by admission of air to the cylinders through a distributer.

Miller Carbureter

There are three features of the Miller carbureter, made by the New-Miller Mfg. Co., Los Angeles, Cal., which distinguish it from the older types of vaporizing devices. One of these is the annular central sleeve arrangement of the automatic auxiliary air intake, another is the absolute absence of coil springs, and the third, by which the carbureter is adjusted from the steering post. The illustration, Fig. 6, shows the method by which the concentric sleeve varies the air intake

Novelties for Motoring

Ingenious Combination of Truck, Jack and Turntable —English Headlight Described—Carbureter Without Springs—Exhaust Signal for Ford Cars—New Priming Fluid for Motor—Worm-Driven Grease Gun

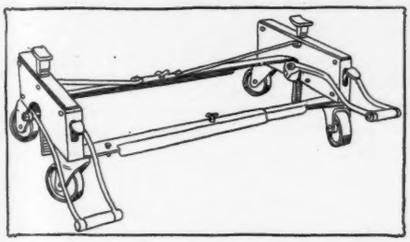


FIG. 4—CURTIS JACK AND TRUCK

opening and also the interconnection of throttle and gasoline control. The steering-post control operates directly on the low-speed adjustment. The needle valve can be varied from the steering post to meet the varying needs caused by changes in temperature, altitude, etc., or the gasoline can be entirely shut off when descending grades to allow pure air to enter the motor through the auxiliary air opening.

Curtis Jack and Truck

A combination of jack, truck, turntable and tire rest is manufactured by the Curtis Jack & Truck Co., St. Louis, Mo. The design is illustrated in Fig. 4, and is put out to overcome the usual inconvenience in handling cars in private and public garages, repair shops, show rooms, etc. The jack feature is operated by foot pressure and is mounted on castings with a ball-bearing swivel so that it can be used as a truck or turntable as well.

Eveland Starter

A combination electric lighting and starting system which has some very novel features is the one produced by Samuel S. Eveland, 226 Land Title building, Philadelphia. The feature of the device is that the combination motor-generator takes the place of the flywheel. The rotating flywheel portion consists of the core and windings of the armature in which the current is generated and which acts as the rotating part of the starting motor. The armature is surrounded by a housing which forms the field of the dynamo and takes the place of the ordinary flywheel housing. The current generated in this flywheel armature supplies the battery from which lighting and ignition is obtained and the battery also returns current when the dynamo is to be used as a motor for starting the engine. To start the engine it only is necessary to depress a push-button and the device will immediately turn the engine over as many times as is necessary to start it. The direct installation of the armature on the engine shaft makes it practically a manufacturing proposition—that is, it is intended to be installed when the motor is built, but it is remarkable for its simplicity in that there are no bearings or moving parts added to the car and as there are no gears, chains or other power transmission devices it is as simple and almost as easily cared for as the flywheel which it replaces.

K-E-W Primer

The K-E-W primer represents a device for introducing a combustible charge of gas into the valve chambers of the motor before starting. That is, before there is any suction produced in the cylinders. It is illustrated in Fig. 7.

The inlet side of the primer pump is attached to the gasoline line immediately in front of the gasoline tank from which the gasoline supply is taken. The pump is of a simple plunger design. Yet it is specially constructed for the purpose inasmuch as it is made adjustable to force the required amount of gas into the motor for starting. A full upward stroke of the plunger fills the pump and a full stroke downward forces the mixture through the outlet pipe in jets inserted in the intake manifold directly in front of the valve chamber. On the first turnover of the motor, this volatile charge is compressed and ignited with the result that the motor is started. The device is the product of the K-E-W Mfg. Co., New York.

Electric Motor Heater

The James electric Thermos for heating the circulation system of cars to prevent freezing and rendering them easy to start is a small electric heater about 6 inches long and about 2 inches in diameter, with connection pipes on each

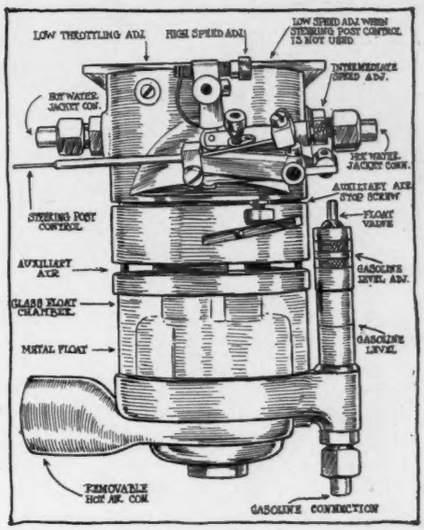


FIG. 6—FEATURES OF THE NEW MILLER CARBURETER

end. One end connects with the draw cock at the bottom of the radiator. The other end connects with the lower water manifold. It is equipped with an electric socket which can be connected in a moment wherever electric current is available. The device will keep the motor warm indefinitely, but by turning the current on a few moments before starting will suffice to warm the motor, put the gasoline in a state of vaporization and liquify congealed oil. It is being marketed by the James Appliance Co., New York. It is illustrated in Fig. 8.

Diva Headlight

A new headlight, the invention of a Bradford, England, man, has recently been placed on the market. It is named the Diva, from its similarity to a diver's headdress, and its use is to be extended to apply to signaling searchlights for the army and navy. The headlight is spherical in shape, divided into two halves vertically. The front half has a double convex lens in the center. The back half has four similar lenses, at the top, bottom, and on either side. The interior is nickel plated, and for illuminating purposes electricity is used. A bulb is placed in the exact center of the sphere, which, on

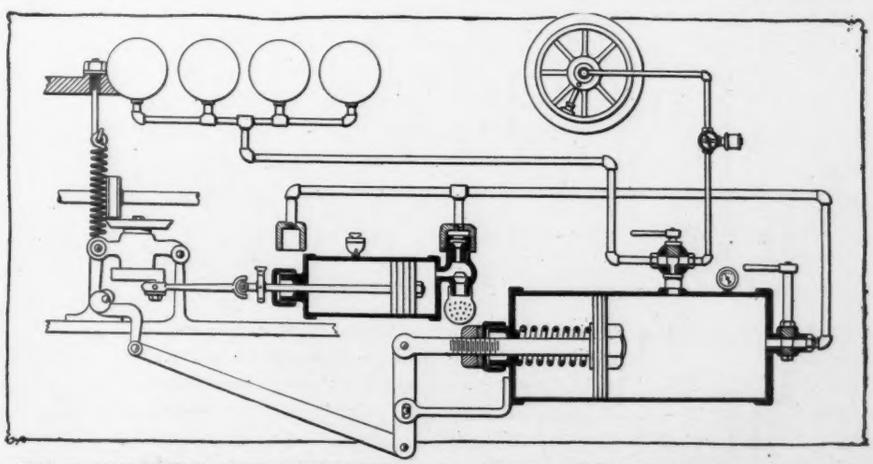


FIG. 5—KNICKERBOCKER COMPRESSED AIR SELF-STARTER AND TIRE INFLATER

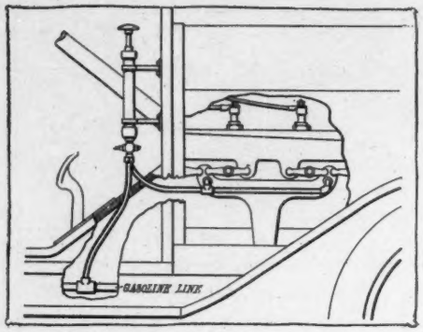


FIG. 7—CONNECTION OF THE K-E-W MOTOR-PRIMING DEVICE

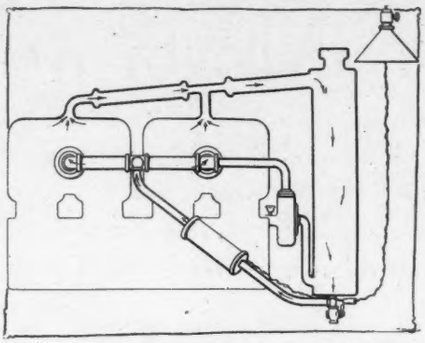


FIG. 8—JAMES ELECTRIC ATTACHMENT FOR HEATING THE WATER SYSTEM

being illuminated, becomes a ball of light. The rays from the four back lenses are directed onto four circular mirrors focused so as to obtain the maximum of light at an angle to throw the beams forward in a straight line parallel with that of the front lens, or otherwise as desired. The lamp is held in position by a special hinged gate or frame in front of the radiator.

The special advantages claimed are, that five times more light can be obtained from any given illuminant; there is no glare as a driver approaches and draws to one side to pass, and the penetrative power of the light is unsurpassed for driving through fog.

Parsons Valve-Grinder

There has been brought out recently a valve grinding tool in which the same action is obtained as when the work is done by hand; that is, the motion of the valve is an oscillatory one combined with a complete turning of the valve, and has the advantage of being about four times as fast as hand work. This tool is made by the Parsons Valve Grinder Co., Kansas City, Mo. The combined motions are obtained through planetary gears which are turned continuously so that the motion is steady. The construction consists of a planetary gear revolving around a sun gear, an eccentric pin in the former giving the oscillatory movement, the whole being operated by a small hand-crank. The gears are steel packed in grease in an aluminum case. The advantage claimed for the oscillatory motion over the pure rotary motion in valve grinding is that the position must be changed frequently to obtain a perfect seat, otherwise the grinding compound will collect, causing abrasions or grooves in the seat which will result in a leaky valve.

Miller Grease Gun

Grease guns which have the quick operating feature are manufactured by Miller & Star, Brooklyn, N. Y. The internal construction of these guns is shown in Fig. 9, in which it will be seen that the plunger is operated by a worm extending through the barrel, the plunger working backward and forward on the worm. It is stated that the 8-ounce grease gun can be filled and emptied in 30 seconds and that 8 turns of the handle will empty the gun. A stream of grease 30 inches long is said to be produced by one turn of the wrist. A feature of the Miller grease gun is that the plunger does not rotate, merely sliding up and down the rod.

Hough Whistle

To provide an exhaust signal which can be sold at a low price for attachment to Ford cars, the Auto Improvements Co., Bristol, R. I., has brought out the Hough whistle. It is arranged to be installed

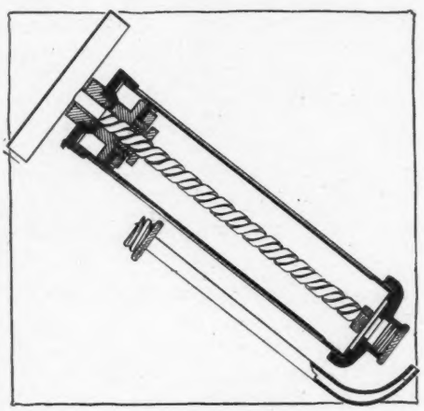


FIG. 9—MILLER GREASE GUN WITH WORM-OPERATED PLUNGER

on the end of the exhaust pipe, the attachment merely requiring the tightening of one bolt and the arrangement for the pedal. Around the outer end of the exhaust pipe clamps an extension whose outer end is square. At its bottom is hinged a drum with an opening corresponding to that in the pipe. There is provided on the drum a wire attachment for a rope to the pedal, and a spring holds the drum normally away from the pipe so the exhaust is unobstructed. When the pedal is pressed, the rope pulls the drum up to the pipe and the exhaust gas sounds the signal. Fig. 10 illustrates the whistle and its method of attachment, and also shows how a free exhaust is provided by it.

Quixtart Priming Fluid

Easy starting of the motor, especially in cold weather, is a convenience much to be desired, and to assist in starting, the Quixtart Chemical Co., of Providence, R. I., is making a priming fluid which is claimed to be thoroughly efficient and dependable. This is called Quixtart and is a very volatile fluid which is used to prime the air intake of the carbureter when both the engine and the outside air are so cold that the former starts with difficulty. It has been tried out for over a year.

Quixtart may be poured into the inlet or auxiliary air valve on the carbureter or, preferably, into a priming cup placed on the intake pipe, the purpose being to mix the fluid with the incoming air. Priming the cylinders is helpful, but not necessary, neither is it sufficient, as Quixtart must be supplied through the intake until the engine is warm enough to vaporize the ordinary fuel. To use the fluid, prime the carbureter or any part of the intake system with 1 or 2 teaspoonfuls before cranking.

Eureka Self-Starter

The Automobile Equipment Co., Detroit, Mich., is marketing a new self-starting device under the name of the Eureka starter. This introduces a charge of acetylene gas and air into the cylinder. The device consists of a pressure-regulating valve attached to the gas tank to reduce the pressure to form 1 to 2 ounces in the pipe line, to prevent danger from leakage; an acetylene carbureter attached to the dash under the hood and a combined kick switch and valve on the dash. The acetylene carbureter is fitted with adjusting valves, mixing the gas with air to a point where the charge has only sufficient power to turn over the engine at a low speed. The combination kick switch and valve controls the ignition and the charge. The starter is operated entirely by the kick switch and the starting button on the coil switch. Throwing the switch to the on position cuts off the spark from the magneto side and opens the valve from the acetylene carbureter to the intake, giving the engine a mixed charge of gas and air as it stops so that it is ready to start next time upon pressing the starting button. The installation of the device is very easy on any car and the price is quite low.

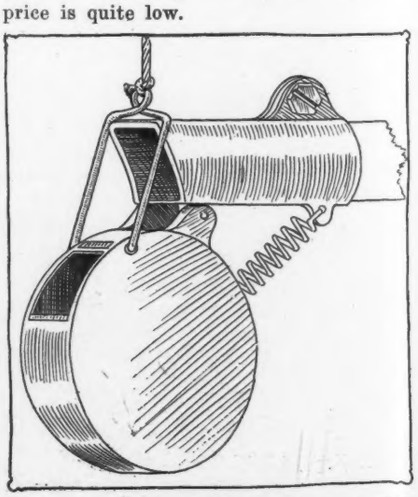


FIG. 10—HOUGH EXHAUST WHISTLE FOR FORD CARS

The Motor Car Repair Shop

Hints for the Amateur

THERE are to be found in many repair shops throughout the country many ingenious appliances in use which have been devised or constructed by the workmen for their own convenience. Three of such devices are shown in the accompanying illustration. In Fig. 1 is shown a very simple tool devised by a workman in the Pierce-Arrow repair shop, Chicago, for the purpose of testing the alignment of the transmission gearset with the motor. This consists of a pointed rod R, adjustably clamped to one side of the universal joint J on the forward end of the main transmission shaft. This rod is adjusted so that the point of it rests within about $\frac{1}{16}$ or $\frac{1}{32}$ of an inch of the edge of the clutch, when it is in engagement with the flywheel of the motor, or with the edge of the flywheel itself. One of the rear wheels of the car is then jacked up and turned slowly or the gearshifting lever is put into neutral and the mainshaft itself revolved while the point of the device is carefully watched. If the distance of the point and the edge of clutch or flywheel remains the same throughout a revolution of the transmission shaft, the alignment of the transmission gearset with the motor is correct. If, however, it should be found that the distance between the edge of the clutch at the top is $\frac{1}{16}$ of an inch, whereas when turned toward the bottom of the clutch the point would touch the edge, the workman would know that the gearset was out of alignment about $\frac{1}{16}$ inch in a horizontal plane and that either the rear end of the gearset would have to be raised or the front end lowered.

Thomas Service Car

Realizing that to keep a customer is as important to the manufacturer and dealer as the making of one, if not more so, the Thomas branch in Chicago has a special technical service car which is continually making the rounds of Thomas customers in and about the city of Chicago, helping Thomas owners and drivers out of whatever little difficulties they may encounter from time to time. This scheme has proved a very excellent one in that it not only shows the interest that the Thomas company takes in its patrons, but considerable useful data regarding the operation and possible improvements is gathered by the experts in charge of this service car. It often happens that much of the dissatisfaction that a motorist experiences with his car is due to the ignorance of its owner or driver regarding certain features of its construction. As an example Motor Age knows of a motorist who purchased a Winton car, about a 1905 or 1906 model. This car was equipped with a mechanical oiler on the dash, which had a lever for testing the oil feeds. If this lever was turned to a certain position the oil would feed through the sight glasses and then pass back into the oiler. It was not intended however that the lever should be left in this position except for the purpose of testing the feeds for during that time no oil would be fed to the various bearings requiring lubrication. The driver of the car was an experienced one and very conscientious and careful but the car which he had driven previously also had an oiler in which the oil dripped continuously through the glasses and then passed on to the bearings of the motor. Believing this oiler to be of the same construction, when he started out with the car he turned the lever so that the oil started to feed

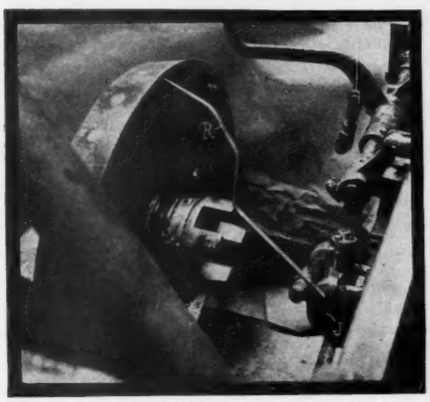


FIG. 1—HANDY ALIGNMENT TOOL

through the glasses. He had not run more than 5 or 6 miles when the motor began to overheat badly. On examining the radiator to see whether there was plenty of water in the cooling system considerable had been evaporated and lost as a result of the overheating. The oiler was examined and found to be well filled with oil and the oil feeds seemed to be working freely when the motor was in operation. After allowing the motor to cool, and refilling the radiator, the return trip was started; but before the engine was brought back to the garage it was again steaming badly and pounding from preignition and loose rods. An inspection then showed that one of the rods in particular was pretty badly burnt and considerable of the babbit metal with which the rod ends had been lined had been melted out. A Winton expert was then called into consultation, the motor fixed up and the idiosyncrasies of the other explained. The bearings then were repaired; fortunately the cylinders were not scored; and no more trouble with the motor was experienced thereafter.

It is just little things of this nature which occur in motor car service that tend to give the manufacturer and dealer a black eye, and create dissatisfaction for which the car itself is not to blame; and it is to keep Thomas owners and drivers thoroughly informed regarding the construction and operation of their product, to aid them in maintaining the proper adjustments, and thus keep down the repair bills as much as possible, that the service car shown in Fig. 2 is used.

Care of Clutch Linings

After a leather-faced cone clutch has been in use for some time without attention, its surface takes on a glaze. This results from slipping which always is accompanied by heating, that draws the natural oils to the surface, causing them to evaporate. This condition further leads to the leather lining getting stiff and hard, and lessens its ability to adhere closely to the metal friction surface of the flywheel. To prevent the formation of this surface glaze and the slipping accompanying it, it is the best practice to use a reliable belt dressing, neats-foot, or castor oil. This should be applied at regular intervals; and the clutch secured in the disengaged position for several hours after the application so that the oil will penetrate through the surface of the leather and replenish the natural oils. This will result in keeping the leather pliable and preserving its efficiency.

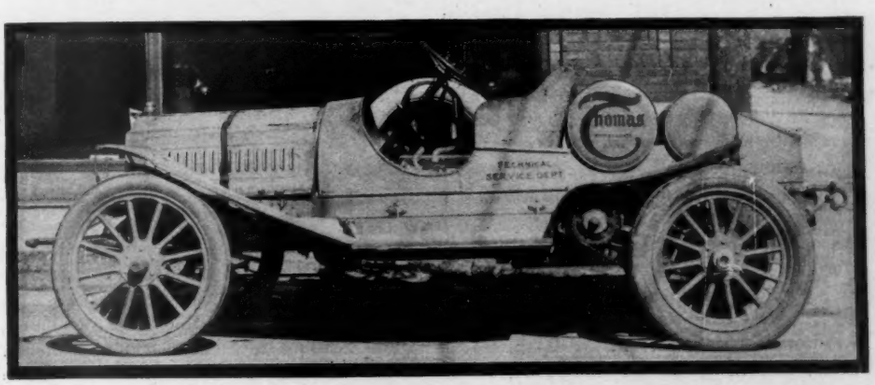


FIG. 2—CAR USED SOLELY FOR SERVICE OF CHICAGO THOMAS CAR OWNERS

Brief Business

SYRACUSE, N. Y.—T. A. Young has the agency for the R. C. H. for this city and environs.

Oshkosh, Wis.—The Doman Motor Car Co. has opened its new garage building, formerly the Oshkosh Y. M. C. A.

Denver, Colo.—W. W. Barnett, 28 West Colfax avenue, agent for the Stoddard-Dayton and Alco, has taken on the Federal truck.

Denver, Colo.—The Felker Auto Co., Denver agent for the Maxwell, has taken on the Sampson truck for Colorado, Wyoming and New Mexico.

Milwaukee, Wis.—A. J. Borget, for some time past purchasing agent of the Beaver Mfg. Co. of Milwaukee, Wis., has severed his connection with the Beaver company.

Cleveland, O.—The Cleveland Automobile Show Co., which was incorporated some time ago to conduct a motor show in Cleveland, has filed papers with the secretary of state increasing its capital stock from $1,800 to $7,500.

Racine, Wis.—The Anheuser File and Tool Co. is being organized here with a capital stock of $15,000 to succeed to the business of the Anheuser File Co., Douglas avenue. The buildings will be considerably enlarged and new equipment installed.

Baltimore, Md.—Another new firm in Baltimore is the Everitt Auto Co. which will handle the Everitt car in this section. The location of the new firm is at 1200 Mt. Royal avenue. F. E. McGee, H. B. McGinn and C. E. Hunter have charge of the new concern.

Boston, Mass.—The G. E. & H. J. Habich Co., agents for the Cole car, has approved plans for the erection of a new building on Bickerstaff street, near the Cole salesrooms, to be used as a service department and garage. It will be 80 feet wide by 100 feet deep and two sides of the building will be practically all windows.

Grand Rapids, Mich.—The Buick Auto Sales Co. has opened its new headquarters and garage at South Division and Pleasant streets, where it has a show room, 60 by 25 feet, and garage room, 70 by 100 feet, affording ample facilities for handling the sales and service business. Claude McAuley has charge of the repair department.

Omaha, Neb.—The T. G. Northwall company has closed contracts for Brush, Detroiter, and Courier-Clermont cars with the following: Van Beck & Everhart, Hancock, Ia.; Galva Auto Co., Galva, Ia.; Elmer Orris Co., Winterset, Ia.; Irwin Auto Co., Jefferson, Ia.; J. C. Jordan, Gordon, Neb.; Waples & Son, Castana, Ia.; F. C. Webb, Guthrie Center, Ia.; G. F. Litchey, Des Moines, Ia.; F. W. Wilwerding, Earling, Ia.; F. W. Bean, Yorkshire, Ia.; O. K. Jones, Lexington, Neb.; Tabor Mercantile company, Tabor, S. D.; Wattson & Lockwood, Chamberlain, S. D.; Jay Welsh, Geddes, S. D.; and the Fremont Implement Co., Fremont, Neb.

Manitowoc, Wis.—J. C. Nelson and Son are building a large garage and repair shop, two stories high, on St. Clair street. It will be ready about March 1.

Denver, Colo.—The Fry & McGill Auto Supply Co. has taken the agency for the G. & J. tire. E. R. Cumbe, formerly agent for the G. & J., now has the Federal tire.

Tacoma, Wash.—Homer W. Bunker has closed with the Olds Motor Works a contract as southwestern Washington representative, with headquarters in Tacoma. A location has been picked at 751 Tacoma avenue.

Denver, Colo.—The Alkire-Smith Automobile Co. of Salt Lake City has been appointed state agent for the Ford. The Blair-James Automobile Co. of Ogden has been appointed to the Ford agency for Ogden and Logan.

Detroit, Mich.—Recent agency appointments by the Havers Motor Car Co. include the following: H. M. Andress & Co., Elyria, O.; B. A. and R. Cunningham, Hackensack, N. J.; Winnipeg Garage, Limited, Winnipeg, Canada; Coleman Brothers and Dillon, Sedalia, Mo.

Lake Mills, Wis.—The Lake Mills Automobile Co. has been organized here by F. A. Previtz, Adolph Voss, Seno. H. Kypke and G. H. Bruns to deal in motor cars and operate a garage. The concern has been incorporated with a capital stock of $6,000.

Buffalo, N. Y.—The Kelly-Springfield Tire Co. of New York city and Akron, O., effected arrangements with the Seneca Rubber Co. whereby a direct factory branch has been opened at 912 Main street, Buffalo. This branch will have charge of western New York, northern Pennsylvania and Canada.

Columbus, O.—The De Tamble Sales Co., of 244 North Fourth street, organized by R. E. Rusk to handle the De Tamble, has contracted for the following sub-agents: Hebron Garage Co., Hebron, for Licking county; Dwight Walker, Lancaster, for Fairfield county; Mark Elsey, Marion, for Marion county; Dr. Putnam, Mt. Vernon, for Knox county; Cheney & Mummaw, Coshocton, for Coshocton county.

Philadelphia, Pa.—John D. Howley has been appointed manager of the Philadelphia agency of the White Co., 629-631-633 North Broad street, succeeding Evans Church, the latter having been promoted to assistant to Walter C. White, second vice president of the company, with headquarters in Cleveland, Ohio. Hereafter, the local branch's facilities will be devoted exclusively to White cars and a modern service station installed in the sales building.

York, Pa.—The Snyder Auto Co., 229 West Market street, has taken the Flanders agency.

Houston, Tex.—The Peden Iron Steel Co. will act as state agent for the Westcott, having organized a motor car department.

Lisbon, O.—The Hamilton Automobile Transfer Co., which has been operated by Hamilton Brothers, has been sold to Clarence C. Smith.

Denver, Colo.—The Felker Auto Co., 1535 Tremont street, has taken the Mack and Saurer trucks for Colorado, Wyoming and New Mexico.

Chicago—The Pilot Motor Car Co., of Richmond, Ind., is now represented in Chicago by the Pilot Motor Sales Co., 1716 Michigan avenue. E. D. Webster is manager of the local company.

Chicago—Walter T. Carlson has been appointed manager of the northwestern branch of the Stromberg Motor Devices Co., 1514 Hennepin avenue, Minneapolis, Minn., in place of Harvey Goodwin, resigned.

Chicago—James Cunningham Sons & Co. have purchased land at 2341-43 Michigan boulevard and contracts have been let for a $100,000 building which is to be utilized for motor car displays, selling headquarters and as maintenance and service station for Chicago and western owners.

Milwaukee, Wis.—The sales department of the Brodesser Motor Truck Co. of Juneau, Wis., at Milwaukee has also taken over the sales interests of the Menominee commercial cars, manufactured by the D. F. Poyer Co. of Menominee, Mich. The Poyer company is turning out two trucks weekly and is now making arrangements to increase its capacity to one car daily.

Indianapolis, Ind.—The Henderson Motor Sales Co. has appointed the following new agents to handle the Cole: Richardson-Neighbors Motor Co., 2039 Euclid avenue, Cleveland, O.;Dayton Automobile Co., Dayton, O.; Corning Automobile Co., Corning, N. Y.; Wolcott Motor Car Co., Elmira, N. Y.; Shafer Motor Car Co., 709 East Main street, Rochester, N. Y.; F. B. Porter, Silver Creek, N. Y.; Fisk & Slocum, Morrisville, Vt.; P. C. Rumboldt, Tonawanda, N. Y.; Bellis & King, Watchung avenue and Race street, Plainfield, N. J.; Cole Motor Sales Co., 90 Mathewson street, Providence, R. I.; John Hemwall Automobile Co., 4612 Washington boulevard, Chicago; Cole-Spokane Co., Spokane, Wash.; C. H. Bergstrom, Neennah, Wis.; Worley & Terry, Viola, Ill.; Palmer Sales Co., Grand Rapids, Mich.;

Announcement

Cole Motor Agency, Shreveport, La.; and Waynesboro Automobile Co., Waynesboro, Va.

Columbus, O.—The Sawyer Auto Specialty Co. has opened a repair and refinishing shop at 43 East Lafayette street.

York, Pa.—E. F. White has joined the forces of the Pullman Motor Car Co. as factory representative. Mr. White will cover the middle western and southern territory.

Boston, Mass.—L. B. Warren, who handles the Austin car in the Hub, has taken on the Cutting. He has salesrooms at 338 Newbury street.

Dayton, O.—The Automobile and General Mutual Insurance Co. was organized recently by D. W. Iddings and others. The new company proposes to specialize on motor insurance.

Chicago—R. S. Mattoon has taken on the agency of the Indiana truck manufactured by the Harwood-Barley Mfg. Co., for Chicago and vicinity, in addition to the Lexington line of pleasure cars.

Lincoln, Neb.—The Capitol Cartercar Co. has been organized here. It is composed of A. E. Anderson, A. E. Kull and L. S. Lillibridge. The company has opened new headquarters at 1121 P street and will handle the Cartercar.

Jackson, Mich.—The Clark-Carter Automobile Co. has placed Cutting agencies with Ferdinand Gonsalas, of Kingston, Jamaica, and George C. Roberts, of Auckland, New Zealand, the former placing an order for seventy-five cars and the latter for 100.

Denver, Colo.—The Denver branch of the Metzger Motor Car Co., M. B. Fetcher, will move this week to larger and more adequate quarters in the well-equipped agency building at 1624 Broadway, recently occupied by the Colorado Motor Sales Co.

Richmond, Ind.—The following have been appointed Westcott agents: Hammond-Lowell & Worden, Binghamton, N. Y.; W. K. Noyes, Glen Cove, N. Y.; W. H. Marble Auto Co., Brockton, Mass.; H. D. Drury, Essex Junction, Vt.; Frederick T. Davis, Bloomfield, N. J. Ray M. Colwell, Cleveland, O., has been appointed distributor for the Westcott line for northeastern Ohio.

Ottawa—Wylie Limited is representing the Gramm truck, E-M-F, Lion, Flanders and Winton. The Peerless Garage Co. is Ottawa representative for the Cadillac. MacDonald & Co. are the sole concessionaries for the province of Ontario and Quebec for the Albion truck. The Pink McVeity & Blackburn Co. is representing Franklin, Hudson, Chalmers, McLaughlin-R. C. H., Lozier, Peerless, White and Stevens-Duryea. Taxi Cabs of Ottawa, Limited, has closed for the representation of the Jackson.

Columbus, O.—The De Tamble Sales Co., of 244 North Fourth street, has taken the agency for the De Tamble.

Syracuse, N. Y.—F. C. Benson, manager of the James Auto Co., will in future handle the Havers in connection with the Hudson and Stevens-Duryea.

Burlington, Wis.—The Burlington Brass Works is completing the installation of lathes, machines and new equipment which will increase the capacity 30 per cent. The line of products will now be enlarged.

Minneapolis, Minn.—The Twin Cities Taxicab Co. has bought two lots in Minneapolis for $6,675 and will build a one-story garage for use of its machines and repair and office men. The Locomobile company has taken the former garage and show rooms.

Minneapolis, Minn.—The Hudson & Thurber Co. has taken on the Cutting car along with the Speedwell and Bergdoll. The Woods electric is now handled by the MacArthur-Zollars-Thompson Co. The Tri-State Automobile Co. has taken the territory for the Marathon line.

Buffalo, N. Y.—Sanderson & Burkhardt, general agents for the Havers Motor Car Co. for western New York state, report closing sub-agencies with R. H. Ives & Co. of Binghamton, Lewis Sands of Albion, Albert Dussault of Lockport, N. B. Healy of Fredonia and J. Cunningham of Rochester.

Atlanta, Ga.—Atlanta will soon have two more branch houses. The Locomobile Co. of America soon will close for new showrooms and a service department. Already the Oakland Motor Co. has closed for show rooms at 141 Peachtree street, and a service department at 26 James street.

Detroit, Mich.—The Church-Field Motor Co. has taken over the lease of the Woods electric garage at 344-346 Jefferson avenue, and also has purchased the good will of the business. The company will establish a local sales agency here and will also conduct a general electric garage business. R. M. Jones, formerly of the Woods Electric, is sales manager for the Church-Field company.

Denver, Colo.—The Cheeseman estate is about ready to begin the construction of a $14,000 garage at the corner of Colfax and Lincoln. The frontage on Lincoln street will be 50 feet and the building will extend to the alley between Broadway and Lincoln, a distance of 125 feet. The structure will be two stories in height. The tenant will be the Colorado distributing agency of the Cole Motor Co., G. F. Cole, manager.

Urichsville, O.—J. W. Lytle has taken the agency for the R. C. H.

Grand Rapids, Mich.—S. A. Dwight has taken on the Krit line of motor cars.

Atlanta, Ga.—The Atlanta Top and Trimming Co. has taken the agency for the Bergdoll.

Savannah, Ga.—R. S. Brown & Co. is the name of the new firm which has taken over the agency for the Stearns cars for southwest Georgia.

New York—The Motor Car Equipment Co., 55 Warren street, a supply concern, has opened an uptown branch at 238-240 West Fifty-sixth street, near Broadway.

Haverhill, Mass.—Lewis R. Hovey and Frank R. Gallupe have formed a partnership and taken the Maxwell agency for that make for Haverhill and vicinity.

Syracuse, N. Y.—W. E. Horton, formerly salesman for A. M. Zimbrich, has opened a garage at 130 Cambridge street and will handle the Bergdoll and Marathon.

Clyde, O.—The Krebs Commercial Car Co., capital $100,000, has been incorporated by J. C. L. Krebs, R. A. Becker, Frank X. Bachle, Homer Metzgar and George Slessman.

San Diego, Cal.—The U. S. Grant hotel garage has taken the agency for the Halladay car. The I X L garage has secured the agency for the Cartercar in San Diego county.

Boston, Mass.—The Empire Motor Car Co. of Boston, agents for the Stutz and Empire, has leased a building on Bickerstaff street, where it will open a Stutz service depot and garage.

Boston, Mass.—The Staver is now represented in Boston, F. R. Parker, who handles the Brush for New England, having taken it on a short time ago. He has opened salesrooms on Columbus avenue.

Boston, Mass.—The New England Firestone branch is completing preparations to move from Columbus avenue to the new structure erected for it on Commonwealth avenue at the junction of Beacon street in the Back Bay.

Detroit, Mich.—H. L. Smith, formerly a traveling salesman for the B. F. Goodrich Co., has been appointed manager of the Detroit branch of the Miller Rubber Co., of Akron. He was at one time assistant branch manager for Morgan & Wright.

Youngstown, O.—S. G. Rigdon, superintendent of agencies and general agency organizer of the Republic Rubber Co., has resigned. Mr. Rigdon will direct his energies in the interests of the Whitmore Mfg. Co. of Cleveland, Ohio, manufacturers of Whitmore's gear protective composition. He will be manager and part owner of a subsidiary company organized

for the purpose of selling the Whitmore product to the motor trade.

Logan, O.—The Gage Auto Co., 160 West Main street, has taken the agency for the Overland.

Boston, Mass.—The Harris Motor Car Co., with headquarters in Brookline, has taken on the agency for the Westcott cars for this territory.

Columbus, O.—Fire of an unknown origin caused a damage of $25,000 on the stock and machinery of the Columbus Auto Brass Co., at Maple and Armstrong streets.

Boston, Mass.—Henry L. Johnson, for many years with the Premier, both at the Boston branch and later at the factory, has resigned to accept a position as manager of the Morse agency in Boston.

Minneapolis, Minn.—Harvey Goodwin, manager of the Stromberg Motor Devices Co.'s local branch will leave February 24 to engage in the sale of Hudson cars in San Francisco.

Columbus, O.—The garage and repair shop at 61 East Spring street, which was formerly operated under the name of the Central Ohio Auto and Garage Co., has been taken over by E. A. Standish & Co. and will be continued in the same location. William Williams was the immediate predecessor to the Standish company.

New York—The Sarco Engineering Co. has taken the exclusive agencies for the sale in this country of the products of the Coventry Chain Co., Ltd., transmission chains; White & Poppe, Ltd., carbureters; Fastnut, Ltd., fastnut lock washers, hitherto carried on at 116 Broad street by S. Hoffnung & Co., Ltd., who is giving up its New York offices. The sales management of this department will be as hitherto, in the hands of Herbert F. L. Funke.

Baltimore, Md.—The contract to handle the Kissel in Baltimore and Maryland has been closed by the Mt. Vernon Motor Co.

Benkleman, Neb.—The Midwest Auto Co. has opened a new garage here, The proprietors will handle E-M-F and Flanders cars.

Sheboygan, Wis.—George Bessinger and Harry B. Moore have established a garage in the Aldag building at 827 Pennsylvania avenue. The firm has not yet completed its line of cars.

Boston, Mass.—The General Motors Truck Co. has arranged to open salesrooms for its electrical department on Boylston street shortly. J. E. Baker has been placed in charge of the branch.

Minneapolis, Minn.—W. L. Waldron will erect a tire row of six stores on one of the principal motor streets. The Guaranty Vulcanizing Co. already has rented a building in the rear of tire row being erected by the same capitalist.

Columbus, O.—The Gwinn Sales Co. has been organized by O. E. Gwinn and others to act as sales agent for the Davis and the Alpena cars in central Ohio. The sales room will be located temporarily at Mr. Gwinn's residence, at 1706 East Broad street.

Rock Island, Ill.—The Horst & Streiter Co. has moved into its new $40,000 building, one of the best and most modernly equipped garages in the middle west, and will hold a formal opening next Saturday. The new company is agent for the General Motors Co. trucks and tri-city agents for the Moline, with Scott county, Ia., and Rock Island county, Ill., as territory. This is the first local agency of the Moline Automobile Co. The garage, 1417-23 Second avenue, has a frontage of 80 feet, is 150 feet in depth and has a capacity of 100 cars.

Grand Rapids, Mich.—The Stratton-Woodcock Auto Sales Co. has added the Broc electric to its line of cars.

Berlin, Wis.—Johnson-Fortnum Machine Works, agent for the Reo, has added the Kisselkar, Buick and Regal lines.

Milwaukee, Wis.—Hans Fost, owner of a garage on Muskego avenue, has filed a voluntary petition in bankruptcy, scheduling liabilities at $22,316 and assets at $38,033.

Detroit, Mich.—The Read Auto Co. has taken the agency of the Metz for the state of Michigan and has opened salesrooms at 541 Woodward avenue. The members of the firm are R. J. Read and J. E. Beatty.

Milwaukee, Wis.—Henry M. Vogel, service man at the Milwaukee branch of the Thomas B. Jeffrey Co., 455-459 Broadway, filed a voluntary petition in bankruptcy, scheduling liabilities at $2,515. The secured claims aggregate $2,115.

Indianapolis, Ind.—A new motor manufacturing company has been organized in Indianapolis by Charles Nesom, Louis Sagalowsky and F. W. Wellman. The company is known as the N. S. W. Motors Co., and has been incorporated with an authorized capitalization of $60,000.

Denver, Colo.—Fleming Brothers, South Denver bankers, are erecting a two-story and basement brick, concrete and steel agency building at 1244 Broadway. The structure will be thoroughly modern and will contain about 20,000 square feet of floor space. It will be ready for occupancy about May 1 and will be leased by one of the local dealers.

Recent Incorporations

Cleveland, O.—M. E. Bertram Engine Co., capital stock $40,000; to manufacture and deal in gasoline engines; incorporators, M. E. Bertram, Alfred A. Guthrie, K. S. Smith, L. M. Keller and A. G. Wallace.

Chicago—Boulevard Motor Livery Co., capital stock, $2,500; conduct motor car livery and garage; incorporators, C. H. Macdonough, C. D. Black and George H. Davis.

Detroit, Mich.—Automobile Forgings Co., capital stock $100,000; incorporators, George W. Strelinger and David E. Van Derver.

Battle Creek, Mich.—Hayes Auto Starter Co., capital stock, $5,000.

Chicago—Available Truck Co., capital stock, $25,000; to manufacture and deal in trucks; incorporators, Edward F. King, Alfred H. Wiedhafft and Robert C. Blume.

Toronto, Canada—Tabe-Sellew Motors Co., Ltd., capital stock, $1,000,000; to manufacture motors, etc.; directors, John B. Holden, D. W. O'Sullivan and George A. Grover.

Indianapolis, Ind.—Smart Mfg. Co., capital stock, $10,000; to manufacture motor car accessories.

Detroit, Mich.—Motor Truck Bosy Co., capital stock, $10,000; to manufacture truck bodies and parts; incorporators, Elmer T. Hangsterfer, Fred G. Proctor and Edwin F. Rauss.

Paterson, N. J.—Auto Shop Co., capital stock, $50,000; to engage in general motor car business; incorporators, W. McKee, F. Beggs and G. F. Wright.

Mansfield, O.—Mansfield Tire and Rubber Co., capital stock $300,000; to manufacture rubber products and handle motor car sundries; incorporators, Walter F. Henne, George W. Heene, C. R. Grant, F. M. Bushnell and B. L. Chase.

Frankfort, Ky.—Nicol Motor Car Co., capital stock, $1,000; incorporators, R. C. Nicol, James V. Nicol and William D. Nicol.

Buffalo, N. Y.—Frontier Tire and Rubber Co., capital stock, $250,000.

Indianapolis, Ind.—Oakes Mfg. Co., capital stock, $10,000; to manufacture motor car parts; incorporators, W. D. Oakes, W. H. Oakes and Cora P. Oakes.

Newark, N. J.—Kaplan Auto Supply Co., capital stock, $25,000; general motor car business; incorporators, A. Kaplan, T. A. Kaplan and L. Umstaeter.

Jersey City, N. J.—Hudson City Auto Exchange, capital stock, $35,000; conduct general motor car business; incorporators, George Lapp, Ferdinand W. Lieberknecht and Pete Bentley.

Clyde, O.—Krebs Commercial Car Co., capital stock, $100,000; to manufacture motor trucks; incorporators, B. A. Becker, J. C. Krebs, Frank X. Bachle, Homer Metzger and George Slossman.

Ft. Wayne, Ind.—Ft. Wayne Auburn Auto Co., capital stock, $20,000; to deal in motor cars; incorporators, J. M. Carmer, H. C. Hoodelmire and E. C. Walker.

New York—Speedwell Motor Truck and Service Co., capital stock, $50,000; incorporators, George A. Pendreigh, Julian Friedman and J. B. Unicake.

New York—M. M. Automobile Automatic Safety Signal Co., capital stock, $50,000; incorporators, John C. McGee, W. F. Rawlins and Ira M. Black.

New York—Alhambra Garage Co., capital stock, $10,000; incorporators, Joseph C. Graveur and Gordon W. Kenney.

New York—J. Barth Cronin Corp., capital stock, $500; motor car business; incorporators, J. Barth Cronin, Phillip A. Hastye and John H. Duncan.

Syracuse, N. Y.—Bissell Garage Co., capital stock, $10,000; incorporators, William H. Bissell, Budd Watts and Philip Manheim.

New York—Auto Mercantile Co., capital stock, $2,000; motor car credit agency; incorporators, Morris Stark, L. M. Loewenthal and Philip M. Lewis.

New York—Colonial Rubber Specialties Co., capital stock, $10,000; deal in motor car supplies; incorporators, George M. Port, Edward F. Aird and Sanford Newman.

Gloversville, N. Y.—Forest Street Garage Co., capital stock, $2,000; incorporators, Samuel Y. Stockamore, Delos Smith and Willis P. Bellinger.

New York—Bidwell-Conklin Corp., capital stock, $5,000; motor car business; incorporators, Harold F. Bidwell, Kennedy Conklin and William F. Stubner.

West End, N. J.—New Columbian Garage Co., capital stock, $10,000; incorporators, Arthur J. Seeney, S. C. Fiero, George Feinberg.

Peekskill, N. Y.—Steinbock Engineering Co., capital stock, $10,000; incorporators, E. J. Forham, H. E. Steinbock and F. B. Knowlton.

Baltimore, Md.—Taxi Service and Baggage Co., capital stock, $150,000; general transportation business.

Fishkill Landing, N. Y.—North Avenue Garage Co., capital stock, $10,000; to deal in motor cars and supplies; incorporators, Ralph S. Tompkins, Ralph S. Jones and Daniel A. Dugan.

Chicago—Chicago Cycle Supply Co., capital stock, $15,000; to manufacture motor car supplies; incorporators, H. P. Hanson, Charles K. McCormick, Richard J. Collins, Rogers and Mahoney.